BEFORE THE

CALIFORNIA ENERGY COMMISSION

INTEGRATED ENERGY POLICY REPORT

LEAD COMMISSIONER WORKSHOP

THE DEFINITION OF ZERO NET ENERGY IN NEWLY CONSTRUCTED BUILDINGS IN CALIFORNIA

CALIFORNIA ENERGY COMMISSION

HEARING ROOM A

1516 NINTH STREET

SACRAMENTO, CALIFORNIA

TUESDAY, JULY 18, 2013

9:00 A.M.

Reported by:
Kent Odell

APPEARANCES

Commissioners

Commissioner Andrew McAllister
Commissioner David Hochschild

Staff

Suzanne Korosec, IEPR Lead
Patrick Saxton, Advisor

Presenters

Ed Mazria, California Energy Commission
Peter Turnbull, Pacific Gas & Electric
Manuel Alvarez, Southern California Edison
Martha Brook, California Energy Commission
Cathy Fogel, Public Utilities Commission

Public Comment & Questions

Michael Day
George Nesbitt
Bob Raymer
Christopher Goff
Charles Eley
Mike Keesee
Mike Hodgson
Ramirez Nanamuti
Rob Hammon
John McHugh
Abdul Mohammed
Brandon De Young

I N D E X

P R O C E E D I N G S

JULY 18, 2013 9:00 A.M.

MS. KORESEC: I'm Suzanne Korosec. I manage the Energy Commission's Integrated Energy Policy Report Unit and welcome to today's IEPR Workshop on the definition of net zero energy in newly constructed buildings in California.

A couple of housekeeping items before we get started. Restrooms are in the atrium out the double doors and to your left. Please be aware that the glass exit doors near the restrooms are for staff only and will trigger an alarm if you try to go out the building that way.

We have a snack room on the second floor at the top of the atrium stairs under the white awning.

And finally, if there's an emergency and we need to evacuate the building, please follow the staff out the building to the park that's kitty corner to the building and wait there until we're told that it's safe to return.

Today's workshop is being broadcast through our WebEx conferencing system and parties do need to be aware that you are being recorded. We'll post the audio recording on our website a

couple of days after the workshop and we'll post a written transcript in two to three weeks.

In terms of context for today's workshop, Public Resources Code requires the Energy Commission every two years to assess major energy trends and issues, including those related to energy efficiency, and specifically calls out the need to identify policies to achieve energy efficiency potential in California.

California's energy agencies have adopted a goal of achieving Net Zero Energy for new buildings by 2020 and for commercial buildings by 2030, and the Energy Commission is evaluating how to incorporate that goal into our building standards.

The 2013 IEPR Scoping Order identified Zero Net Energy as one of the topics that would covered in this IEPR cycle. And today's workshop focuses on the definition of ZNE as it applies to newly constructed buildings.

For our agenda today we'll begin with a presentation by Ed Mazria on opportunities and challenges associated with California's Zero Net Energy goals, followed by presentations by Pacific Gas & Electric Company and Southern

California Edison.

We'll then have a joint staff presentation from the Energy Commission and the Public Utilities Commission that talks about current efforts to define Zero Net Energy, some of the challenges that involves, and key findings from some ZNE studies.

We'll then open it up for public comments, at which point we'll take comments first from those of you in the room, followed by those participating in the WebEx, and then finally the people who are on the phone only.

For those of you in the room, please come up to the microphone at the center podium to make your comments so that the people on WebEx can hear you and so that we capture your comments on the transcript.

It's also helpful if you can give our court reporter a business card either before or after you speak, so that we make sure that your name and affiliation are spelled correctly in the transcript.

For WebEx participants, please use the chat function to tell our coordinator that you'd like to make a comment.

And phone-in only participants, we'll open all the phone lines after we've taken comments from the folks in the room and the WebEx participants. And for those of you on the phone only, please keep your phone muted unless you intend to speak, otherwise we get a feedback on our lines.

We're also accepting written comments on today's topic until close of business August 1st. And the notice for today's workshop, which is out on the table with the handouts and also on our website, explains the process for submitting written comments to the IEPR docket.

So with that, I will turn it to Commission McAllister.

COMMISSIONER MCALLISTER: Right. Well, thank you very much. I'm looking forward to a great workshop this morning, so it's a half-day workshop so I mean I have to say a nice little reprieve for me from having how many all-day workshops have we had in the last three weeks on IEPR.

Let's see. To my left is Patrick Saxton, my advisor on these issues, on all things energy efficiency really. And at some point

we'll likely be joined by Commissioner Hochschild, so hopefully he'll be able to spend the majority of the time with us, or at least a good chunk.

I just wanted to kind of frame this and let people know what we're trying to accomplish here and frankly what we're not trying to accomplish here.

You know, first of all, kind of we know 2020 is almost upon us, right? As a practical matter, it'll be on us really before we know it. And now that we actually have a new construction market, we have a housing market that's much more robust than in the recent past. New development's picking up. Many of you are involved in the construction industry, certainly, and know this probably better than I.

You know, currently much in the new construction pipeline is projects that were started prior to the housing bust, but that won't be the case for very long. New developments have a timeline of three to five years, sometimes longer, which basically puts us pretty close to 2020.

So it means that those coming online in

2020 may already be a twinkle in some developer's eye, right? So we really need to be laying the playing field for this very clearly, and in 2020 these homes will need to be ZNE, meaning in the most practical sense that they'll have to conform to 2019, assuming we are on track for that, Title 24, California Building Efficiency Standards.

So we're here to discuss the definition of Zero Net Energy for policy purposes. It sounds simple, a building that produces as much energy as it consumes. And we have a lot of technical information, we have a lot of understanding of the marketplace, and we can always have more, but there's a good basis for discussion here and there really needs to be because, as I said, 2020 is coming down the pike pretty quickly.

So a few things we're not doing today. We're not determining the future of net energy metering; let me be very clear about that. That's the role of the Legislature and the subsequent appropriate implementing agencies and that really mostly does not include the Energy Commission.

We're not doing rate making. The CEC

does not do rates. We don't have that competence or that mandate. We do look at the value of energy in time-dependent valuation terms, and this certainly relative to rates I think it has some additional stability over time, but it too does change, it too does change and will change with the evolving resources mix and T&D infrastructure, etcetera, so we're not in a rate making discussion here.

We're also not really debating the wisdom of Zero Net Energy buildings as a state policy goal. It is our policy goal. So we're trying to be surgical here, we need a definition so that we all know where we're aiming, so given that it is the policy goal, so let's develop and adopt a definition. That's really what we're trying to accomplish here today.

We're lucky to have the lead staff from both Energy Commission and the PUC here today. They've been busy on this topic and I think have made a lot of progress getting us towards a definition. We're going to hear about that today. I'm very excited to sort of see the latest.

And bottom line, the proximate need here

is for a definition of ZNE that can stand the test of time without presuming to know exactly what markets for specific technologies will do in the future, is simple enough to be understandable and enforceable, and provides paths for compliance in particular cases where self-generation options are limited or overly costly. We need a functional definition that the marketplace can actually use.

So I want to thank everybody for coming, particularly the IEPR staff, Suzanne and the team again. They keep knocking it out of the park here and keeping the trains running on time and it's quite a heavily loaded freight train here at this point.

And certainly to the building staff and the PUC staff as well that's working on this topic together, I know that they have been really putting in a lot of hours and time and slogging through the tough issues here, so I'm really looking forward to the day and let's get started, so I'll pass it back to Suzanne.

MS. KORESEC: All right. Our first speaker is Ed Mazria. He's going to be doing his presentation via WebEx. So Lynette, is he on?

Ed, can you hear us?

MR. MAZRIA: Yes, I can. Can you hear me?

MS. KORESEC: We sure can, so go ahead.

MR. MAZRIA: Okay. Let me -- hold on one second. Okay, do you see the first slide that says "California's Commitment"?

MS. KORESEC: No, we do not. You might want to hit "Share Desktop."

MR. MAZRIA: Hold on one second. Okay. Do you see it now?

MS. KORESEC: No, not yet.

MR. MAZRIA: Okay. Let me do one other thing here, oh I'm sorry. Microsoft PowerPoint, there we go. Do you see it now?

MS. KORESEC: We don't have it on our screen, but it's apparently showing on the WebEx, so.

MR. MAZRIA: Okay, shall I, let's see --

COMMISSIONER MCALLISTER: Is that a problem on our end or on his?

MS. KORESEC: Yeah, I think that's a problem on our end, so yeah we're contacting our IT folks right now. So if you want to just go ahead and maybe start on your intro while we're

trying to deal the technical stuff on our end?

MR. MAZRIA: Okay, so it's on the WebEx then?

MS. KORESEC: Yes, it's showing on the WebEx.

MR. MAZRIA: Great. Okay, so the title of this presentation is California's Commitment. And initially I want to talk about the goals of California's commitment Zero Net Energy for residential buildings by 2020 and Zero Net Energy for commercial buildings by 2030. And the reason that these targets and these goals are so important, is because they have global implications. So I'm going to talk about that first and then I'll discuss a definition and how to meet those targets.

MS. KORESEC: And just so you know, we are seeing your slides now so it's okay.

MR. MAZRIA: Okay, great. So why does what California does with these targets have global implications? So I want to look at the big picture for a minute.

This is global energy consumption today. We use globally about 542 quadrillion Btus or 542 quads. Fossil fuels provide about 452 of those

quads, hydro supplies about 42 quads. All the sun, wind and biomass in the world today supplies about 19 quads and nuclear, we have about 437 plants globally and they supply about 30 quads.

If we project out these are the projections: out to 2030 we'll need about an additional 180 quads to power the world, so it looks like we're going to be going up roughly 722 quads. Now, these numbers change on an annual basis depending upon what's going on, but this is the latest projections that we have.

And the projections are that 122 quads of those 180 quads are projected to be supplied by fossil fuels, hydro another 21 quads of that 180 probably mostly in Southeast Asia. Sun, wind and biomass is expected to double to about 19 quads. And we're expected to increase our nuclear plants up to about 650 plants, mostly again in Southeast Asia, and will add another 17 quads. So that's what the picture looks like. So that's what the picture looks like.

Now, there have been some studies recently that I've just seen that indicate that sun, wind and biomass might be quite a bit more than 19 quads, it might even double that number.

But even if it doubles or triples that number, you look at this picture and it's not a pretty picture for our climate change or reducing our fossil fuel consumption globally.

So the opportunity is really on the demand side of the equation. And the reason is that by 2030 there'll be another 1.6 billion additional people that will live in cities worldwide, so again we're looking at the global picture here. By 2030 that is going to roughly equal about 900 billion square feet of new and tear down and rebuild buildings globally in urban areas.

To give you an idea of what 900 billion square feet is, if we took the entire United States and scraped it clean: no buildings, no buildings in California, no buildings in New York, no buildings in Las Vegas, Nevada, just scraped the U.S. clean and then rebuilt it exactly the way it is today three and a half times over, that's 900 billion square feet. So in the next two decades we will literally rebuild the world.

So where is all that building going to take place? This is actually a critical to

understand the growth in building construction and California's role in all this? About nine percent of that is going to take place in all or back in the Middle East. These are projections again, by the McKinsey Global Institute. About another nine percent in Latin America, India itself will be responsible for about nine percent. Other emerging nations, mostly Southeast Asia, will be responsible for about twelve percent.

The U.S. and Canada and mostly obviously the U.S., the projections will be responsible for about 15 percent of that total gross over the next two decades and obviously China is critical, it's about 38 percent. But between China and the U.S. you have over 50 percent and if you includes the rest of Southeast Asia you're well over, you're about 65 percent of the total construction in the world. That's critical, because the U.S. influences what happens in China. So you have a majority of the growth happening between those two areas.

So if we look at where California is located obviously it's on the Pacific Rim. And many of our major architecture, engineering,

building firms located on the West Coast are also obviously located in China. So there is a big influence between what happens in California that influences to some degree what is going to happen in China. And what happens in those two countries obviously influences what happens around the world.

So in order to come up with a definition of Zero Net Energy there were a number of elements we looked at. And again, this is just a proposal for you to consider.

You know what the definition is for newly constructed residential and commercial buildings. And we understand and we've come to understand also, just by our own experience, that it really should be one definition of ZNE to not confuse the marketplace. It should be simple, understandable, everybody understands it then this is where we're headed.

We know that for California it's going to obviously need to incorporate the societal value of energy, which is embedded in the time dependent value of energy, and that in order for it to succeed it must be fail proof. That means it must be a path for all buildings, the

definition must be a path for all buildings to meet Zero Net Energy without a burdensome bureaucratic or administrative nightmare on figuring out which buildings are going to meet it and which buildings aren't going to meet it.

So given all that, we looked at that and so a definition that we would propose and put before you, obviously for consideration and discussion, is that Zero Net Energy is a newly constructed building that meets California Building Energy Efficiency Standards, and I'll define that in a minute. And the value of onsite or offsite renewable energy equals the value of the energy consumed by the building annually. The emphasis will be on the value of onsite energy, making it a lot more lucrative to do that than offsite energy. And I'll discuss that now in a second.

So what do we mean by building energy efficiency standards in the definition of Zero Net Energy of getting to that by 2020? And what we understand that to mean is that a building built in 2020 would meet roughly a California HERS minimum rating, of a HERS 30.

And that is really a prescriptive

requirement, so if you're going to design or build a building that meets a ZNE definition your efficiency standard would be that it get to at least a HERS 30 or below, so that then onsite renewables are not burdensome. And that those energy efficiency standards obviously optimize energy efficiency, their requirements and also demand response.

And that should probably happen by the Title 24 updates in 2016 that would incorporate time dependent values. So by 2016 that code update, which then would go into effect in 2017, should roughly get one to about a California HERS, so minimum California HERS then.

And then in order to meet the Zero Net Energy definition you would incorporate onsite renewable energy but TDV valued, and this is important, to offset any of the remaining energy consumed after you've implemented the minimum efficiency standards or better. And if it's TDV valued that means that you're getting a lot more value per kilowatt or Btu generated to offset the amount of remaining energy that you would use. And that makes it pretty lucrative to go that route and/or if you would be able to purchase

renewable energy to offset the remaining energy consumed after efficiency, but that would be Btu for Btu so you're not getting any additional value for that energy.

And it should be a lot more expensive than incorporating onsite renewables where you do get the time dependent value, especially if you're doing portable takes and it's during the daytime and during peak loads.

And there are other ways to make the purchased energy between now and 2020 a lot more expensive than onsite. One would see how onsite renewable energy comes down in price between now and then and there could be either incentives on one end or not incentives on the other end to make purchasing a little more expensive.

So what you're doing is you're valuing onsite renewables, so that you incorporate the notion of purchasing renewables for all those cases where someone can't meet the targets by incorporating onsite renewables. A shaded site, there's a tree on the site, it's an old tree or you want to locate the building on one part of the site and not the other part of the site. But you make it lucrative to really look at onsite

renewables first. This way you alleviate either a bureaucratic or administrative nightmare in figuring out per density -- for all the barriers for generating onsite.

I mean, there would be so many different situations that you would need quite a bit of staff at the local level to figure out which ones need it, which ones don't need it, how you really incorporate that into codes. This eliminates all that and eliminates all that expense by the way. And so once you add together the building energy efficiency standards and the renewable energy requirement you would then equate to a California HERS rating of zero.

So on the scale of the California HERS rating scale the 2008 T24 is rated at about a California HERS 100. And my understanding is that the 2013 T24, which will be implemented in 2014, would get to about a HERS 75, maybe even greater. I've seen some numbers that are around 80 or maybe even a little higher than that, but it's going to fall somewhere in that range.

And then what we would recommend, again these are recommendations that the 2016 Title 24, which would go into effect in 2017 would get you

down to a HERS 30. So that would be essentially a ZNE ready code. That would be getting you ready for 2020 and then in 2020 it would be the 2019 code. That would incorporate the 2016 Title 24 prescriptive requirements getting one to a HERS 30 and that would be the prescriptive requirements plus the renewable energy either onsite or the much more expensive option, which would be purchasing would get you to a true Zero Net Energy building as by the definition that we propose.

Now the challenge of course is going to be, and we're getting close to 2020, that the closer we get what you want to try to do is reduce any barriers to obviously getting to Zero Net Energy, so that you eliminate most of the pushback that might occur.

We know from experience that the first-time home buyer's tax credit, the $8,000 tax credit between 2009 and 2010, that went over about an 18-month period, about 303,000 people took advantage of that tax credit. So what we would propose is that there be some incentive, and we just said it here for the purposes of discussion at $8,000, because we know a lot of

people will take advantage of it purchasing a home. And we said, okay, what about an $8,000 home buyer incentive for purchasing a new California ZNE home and have that program go over around be established over a three-year period somewhere between now and 2020? So that the goal is to get at least 10,000 new ZNE homes built and purchased incorporating only onsite renewables, by the way, in California so that you have already ZNE buildings going up and that reduces any kind of pushback.

Now the incentive, and we've seen it done quite a number of ways, it could either be a rebate, a tax credit or a public-private partnership.

So for example, a ZNE bill was just passed last month in Colorado. It was called the Colorado Energy Savings Mortgage Program and what it did is it reduced if you bought a ZNE home, your principal on the loan would be, on a mortgage would be reduced by $8,000. And it was a public-private partnership, so for example a $400,000 home mortgage if you were purchasing a home that you were going to go get a mortgage for $400,000, the banks who were authorized to

produce these loans would put in about a half a point, $2,000, so they would buy the principle down $2,000.

Now banks, why is it good for banks to do this? Well, Bank of Colorado is doing it because banks charge about 2 points on a mortgage and so to give up a half a point or $2,000 to do more mortgages kind of washes out economically in the long run. And the banks get quite a bit of PR out of -- that would be one of the banks that participate in this program, they're providing mortgages for Zero Net Energy buildings, so in a sense it doesn't cost them anything because they're doing more mortgages and they're giving up a half a point and they supply $2,000 of that $8,000. And then the States and Utilities in Colorado are combining to provide the other $6,000 bite-down of the principle.

So that's one way to do it, but there are tax credits. New York State is looking at a $10,000 tax credit for Zero Net Energy. Barbara Lifton, the state assemblywoman, put that bill in. It'll go in again in the next legislature and it looks like it has a good chance. There's a bill that went in in Oregon, so it's kind of

based on a first-time homebuyer's tax credit and again that was only for first-time homebuyers. This is, for any homebuyer it should be a no-brainer.

So who is likely to support some kind of incentive depending upon what it is? And again, we put that out only as a recommendation. Well, what we found is for a homebuyer's incentive obviously the homebuyers like it, because they can build and they'll be building to ZNE and getting those homes sold. Specialty construction trades like it and we have found that these folks have supported, in different states, this type of legislation. Cities obviously like it, because they get taxes on the construction. Counties like it, they get property taxes and other taxes. Chamber of Commerce in New Mexico came out for this type of legislation and we passed it this year.

The environmental community likes it, would support it. The renewable energy trades, obviously the solar installers would kill for it. The realtors and real estate developers and real estate community likes it because we're selling more homes.

Interesting the community colleges came out big time in support, because they're training all these kids to install photovoltaics, to upgrade homes, things like that and there aren't any jobs out there. So they like it. The architects and designers obviously love it. And the banks like it.

So you really have a coalition across the board and we found no one coming out against it in that sense.

So I'll conclude with that. You know, I've thrown out a lot of information and proposals and hopefully it spurs on some discussion. And again, I think to keep in mind is the big picture, that it is absolutely critical globally that California succeed in its goals and targets of meeting ZNE by 2020 and 2030. Thank you.

COMMISSIONER MCALLISTER: Thanks very much, Ed. I have actually a clarification question on the Colorado program if you could just indulge me for a second. So who gets the $6,000? Does that go directly to the builder or does that go to the bank or what?

MR. MAZRIA: No, it goes to the

purchaser. So it buys down the amount of the mortgage. So if you had a $400,000 mortgage your mortgage would be only 392,000, so your monthly outlay would be less. And if you run the numbers on energy save for ZNE and the cost of getting ZNE we threw in a number of about, to get to ZNE in Colorado we threw a number of about 30,000 in there to get to ZNE over a standard building. They're built to ENERGY STAR level.

It's very, very lucrative for the home buyer. So we're essentially doing what the car companies have been so successful doing and what the first-time homebuyers' tax credit did back in 2009-2010. You incentivize the demand side, so you give a tax credit or yeah. And it's a time-proven and tested strategy to increase demand of whatever product it is you're trying to look at.

COMMISSIONER MCALLISTER: Yeah, it's interesting right, because we're dealing with a number of similar issues about how to really get to true scale in the retrofit market and in the new construction market. And it's clear that demand side needs to, we need to kind of help on the demand side.

And, you know, as agencies and policy

implementers and makers to some extent we're not actually that accustomed to dealing with markets. And so we need to sort of figure out the central message and then set up the playing field, so the market can actually play, right?

MR. MAZRIA: Yeah, and let me put forward something. I think what a lot of people miss is when to actually incentivize renovation and when to incentivize new building construction. So this obviously is new building construction, when you're building a building obviously that's the time to incentivize, and you're purchasing the building, to incentivize a marketplace to do greater and greater efficiency.

But in renovation you can do weatherization when people are living in their buildings, but to really do deep renovation in the housing market it's best when a existing building is being bought before people move in, because it's incredibly disruptive to do deep renovation when people are actually living in a building. People will do it, but it's pretty disruptive. People get divorced over it. And so it's not a simple thing --

COMMISSIONER MCALLISTER: Yeah, I just

bought an existing home, so I really am not happy to hear that Ed.

MR. MAZRIA: Well, what I'm saying is most people do weatherization, they'll do the simple things where you're not actually ripping out walls and you have to move the kids out and the dogs out and you're sanding gyp board and I mean, you know, you're out for a month. So the time to do that is either at a refi or if you're purchasing a building and that's what we found.

Now, obviously the people who are committed and find it really lucrative to do deep renovations while they're in a building will do it. So but anyway that's just something that we've looked at.

COMMISSIONER MCALLISTER: So I just wanted to just tell folks listening on the web and here in the room with us, that we wanted a little bit of an outside California or a more global perspective, a larger perspective, to kind of put this into context to stimulate discussion here. And kind of acknowledge that yes, California's a leader in the leadership position as Ed rightly says, but there are things going on in other parts of the world. There are creative

thinking, creative groups doing interesting things in other places and so sort of put this in context. And, you know, keep on the table the bigger issue of what we're trying to accomplish, so we can all kind of keep that in mind as we go forward with a California-specific discussion.

So it looks like Martha has a question.

MS. BROOK: Yeah, this is Martha Brook of California Energy Commission staff. I just wanted to make one clarification, because Ed's slides are going to be up on our public website. And anyway, the 2013 standards do not reach the HERS 70. It's closer to 90 and that's because there's this huge amount of energy that we don't regulate under the building standards. And so we can make a huge change in the building standards when we still have appliances and plug loads that are keeping that HERS rating pretty high. And I just think it's important for everybody to understand that, you know, a 20 percent reduction in code doesn't mean a 20-point change in the HERS scale.

COMMISSIONER MCALLISTER: Thanks for that.

MR. MAZRIA: Thank you.

COMMISSIONER MCALLISTER: Thanks very much, Ed. So if you can listen in on the rest of it that'd be great. I'm sure some folks might have questions or comments that are relevant for you as well.

Are we going to go with questions here after each presentation or are we going to try to?

MS. KORESEC: We were actually going to, since we have such a short agenda we were planning to hold it for the public comment period, if that's okay. But if you'd prefer we can do it now.

COMMISSIONER MCALLISTER: I guess I'm happy to, well I don't know that we want to vet Ed's presentation fully. Let's get it on the record and let's sort of put it into the mix and then hear the final two presentations. And then if we want to take a little bit of break between panels for some clarifying questions then that's probably okay to do.

MS. KORESEC: Okay. Okay, we'll do that then, we'll take questions and after we hear from our outside folks before we get to our staff presentations

All right, our next presenter is Peter Turnbull from Pacific Gas and Electric Company.

MR. TURNBULL: Well, Commissioner McAllister and members of the staff and audience here, it's a pleasure to be here and we appreciate the opportunity to speak today on this issue.

It is in no small way a little bit intimidating, but also a great honor to go after someone like Ed Mazria who has been a great leader in this field for a long time. And I would like to make just a quick aside to start off that he served as a judge in the Zero Net Energy building design competition we ran last year using a site at UC Merced. And has again agreed to serve as a judge for this year's competition, which is using an affordable housing site, a kind of a modest high-rise in the tenderloin of San Francisco, which will be a real challenge.

So with that aside and also have to note a little irritating to go after an architect, because the architect always has better slides, right? You know that.

So to be responsive to Commissioner

McAllister and the idea to be surgical about this, this morning, we have some comments. We've had a long-standing goal to work in energy efficiency renewables and so on and also the building codes, which support that. We've been, of course, active in that together with the other IOUs for quite a long time, more than a decade. We really agree that a clear, singular definition is essential and it has to be a code-based definition.

We support the idea of using TDV as the metric to establish the requirements and in fact, at least in my view, the definition really hinges on the metric as a practical matter. We support it, we think that there are some imperfections and we think that there's some forward-looking corrections that need to happen. But we think that's especially true with respect to power exports from buildings to the grid and it becomes more and more critical as we get closer and closer to ZNE going forward. So in a nutshell that's this.

I think we'll see more about this in the staff presentation later, but we believe that ZNE will soon be technically feasible for the bulk of

the building stock. This is a finding from a study that conducted by EROP, by the IOUs, managed by PG&E. And the central finding as it's stated there, it would be technically feasible for much of the newly constructed market. There's, I think you guys, Martha has a graphic on this later. Obviously the less dense buildings are easier to get to than things like high-rises and hospitals, but on a square-foot basis it's in the range of 70 to 75 percent we think.

PG&E and the other IOUs and SMUD, I believe are actively engaged with the CEC on a measure-base tactical plan to enhance the building standards through the CASE initiatives, Codes and Standard Enhancement Studies. That's consistent with what we've been doing now for at least, well more than a decade, so we're very engaged on this and eager to see it move forward.

We think speaking to some of the points that Ed made, that there's something to work regarding ZNE, Time Dependent Valuation and public understanding. We have noticed ZNE means different things to different people. For a code definition we really need to coalesce on a single

metric I thin.

And this is in the context where we see this term. I've been in this business for over 30 years and I've never seen a term energize the design community like this concept of Zero Net Energy. So if we hold a forum at PG&E that's open to the public and we call it a forum for high-performance buildings in Northern California, we get four people. If we call it a forum for Zero Net Energy buildings in Northern California we pack a room with several hundred people. And so this is an energizing topic and it really has captured the imagination.

I think we need to capitalize on that. We would still just point out that something like Time Dependent Valuation is not understood by the lay public. I would say that I have to be having a pretty good day to understand it myself. It's probably not realistic to expect the lay public to understand this concept, but I don't know that we need to do that, but I think we should maybe have that on the horizon.

Where it would become important would be if someone's buying a home and we tell them it's got the stamp, ZNE, say seven years from now.

And well, what does that mean, and we go into a long discussion on Time Dependent Valuation is probably not going to resonate with the home-buying public, right? That's a communications issue though and we shouldn't back away from the concept of having a robust definition.

We don't want to get into rate making here. We realize that, our world though is this world where we believe we've got cost-shift issues when you have building ZNE buildings with PV systems. We don't think that the costs that are imposed by those systems are fully captured under the retail rates. We don't think they're maybe fully within the TDV system at this point, so we think that that's something can be addressed going forward.

The cost-shift issue, while of course it's not in the purview of the CEC it is nonetheless putting costs on to the nonparticipating customers and that's very much an issue to them, of course.

We think it's probably not good to do messaging associating with Zero Net Energy as zero energy bill. We don't think that that ends up being sustainable, so those are some things I

think we point out. Not with any real defined solution at this point, but things to work on going forward.

But for ZNE to succeed at scale we do need to get solutions around things.

COMMISSIONER MCALLISTER: Peter, can I just chime in there and since this is an intimate group I think I'm interested in sort of having clarification as we go.

So I agree the messaging is an issue and ZNE kind of as a term has a lot of kind of potential liability wrapped up in it. And, you know, you point out from your perspective you're implying zero bill has some issues, but just as a matter of practice it's not going to be even Zero or Zero Net Energy for all people. There's going to be a standard deviation and behavior in it and plug loads and all that stuff is all going to play into this.

So I guess so we have a goal for code to be at Zero Net Energy, but we don't necessarily -- I mean, not withstanding your point about the term being an attractive term for people it'd be nice to hear from stakeholders, not just PG&E, but all stakeholders about what we might call

these buildings to the public, right? We can have an internal goal of ZNE, but that doesn't by any stretch mean that the homes have to be marketed as ZNE. They're just code compliant. We're talking code here, so they'd be code compliant.

And the developer, and it might be a qualified developer or the development might be a green seal or whatever, but I guess it seems like it's kind of a separate discussion about how we ought to label this for marketing purposes. And so that issue, I think, ought to be on the table. It's not necessary for our adoption of a definition in its context, but it's sort of an adder that I think is pretty important to the discussion for the longer term.

MR. TURNBULL: I completely agree and I think we ought to hear, I think it's something that needs to be solved. I've been our Zero Net Energy pilot program manager for the last three years and it's I don't know the answer to that issue. But we definitely need some branding around it and it's the branding has to be consistent with what the customer is going to get, of course. So I think that that's certainly

correct.

So we take in a nutshell, the first bulleted point there, the TDV itself as we move down the efficiency. Thinking of it maybe at the HERS scale for 100 today and then down that scale. For power taken from the grid, we think TDV does a pretty good job.

The breakdown in our view at least, is when TDV -- when we start exporting power to the grid from the home or from whatever the building is that at the risk of oversimplification as the building load goes down the wires and pipes in the infrastructure needs are reduced. You could say that the wires can get smaller, but when we start exporting of course the wires don't necessarily get smaller.

We don't want to cry wolf on this or to say that there's no solution to this or anything of that nature at all, but just that we don't think that metric is working for power export to the grid and that there's probably some work there. Is there something that goes into that metric or when we get to the export do we do it a different way and plug it in or what? That part needs to be solved, I think.

So that's I think the point of this slide.

COMMISSIONER MCALLISTER: I guess I would just point out that the penetration of EVs is kind of a big wrench in that works there too, because that may determine whether you can downsize the wires as well, right?

MS. TURNBULL: Absolutely.

COMMISSIONER MCALLISTER: So that kind of inherently is part of the discussion for the long term.

MS. TURNBULL: So a slide that looks like it might be familiar to us after the last presentation, I think so graphically where we are today at 100 moving down to ZNE ready at something like 30 or 35, qualitatively something in that nature or I guess it's quantitative, but we mean it sort of qualitatively. And getting there in a couple of steps between 2013 and 2012, meaning the two different code cycles between then and now, that that area between the 2013 and the ZNE ready then for TDV is less problematic than when we start moving down from 35. I think graphically that would be the way I'd say the point from the previous slide.

A couple of other things that come up, it's inherently of course a moving target if we're successful with what's going on. The values of time dependency will shift and then measures that are great today become maybe not so great and measures that aren't so great become great, right as time dependency shifts over time. And I think it's just something to be aware of as we move forward with code.

It's certainly an issue of communication to the building industry if Measure A is wonderful now and then becomes less so three years or seven years from now. And this did come up, this concept of stranding assets becomes really an issue if too much of that happens. We did talk about that on the May 29th workshop a little bit and that was pointed out by multiple players really. So this is another thing that needs to happen in our view with Time Dependent Valuation.

One other thing not maybe slightly outside of just the TDV point here is we do have, of course, a code that's building by building. And we think that of course you're considering cost effectiveness with TDV at the building

level. We think that there are potentially some economic benefits and then some operation benefits from the point of view of the grid by looking at maybe district level solutions. More so rather than only looking either at building by building individual homes versus a central power station, which of course is outside of the building standards scope.

You could have economies of scale possibly for something like a ground source heat pump or some other measures that are efficiency-related measures that today really aren't particularly encouraged by the way the code works. And, of course, you could do that with a photovoltaic system, so that rather than 2,000 individual systems in a subdivision you might have 1 or 5 or 10 or something of that nature. There could be some operational advantages to that as well as it could be less expensive. So we recommend, and maybe this is a legislative solution, but that there be methods of incorporating some of these district system benefits into code if possible.

So that's a point I wanted to just bring up. And now I know I'm done when I come to this

slide, so that's that.

COMMISSIONER MCALLISTER: Thanks a lot, Peter.

MS. TURNBULL: Thank you, very much.

COMMISSIONER MCALLISTER: That's helpful, thanks.

MS. KORESEC: All right, our next speaker is Manuel Alvarez from Southern California Edison. Okay, where is it?

MR. ALVAREZ: Good morning, Commissioner. My name's Manny Alvarez, I'm with Southern California Edison and I guess I'm pleased to be here today to talk about this issue of Net Zero Energy (sic) for this definition. I was kind of pleased to hear opening remarks in terms of trying to focus on the definitional question, because it seems like as we get into the various details of Net Zero it gets complicated and it gets argumentative with folks, because the definition is not there to guide us.

So what I'm trying to set out today is basically some parameters of what the definitions should be and then try to lay out for you some of the key principles we think that should be employed as you kind of go through this process

of developing the definition as well as develop the overall program for the Net Zero Energy.

So the first slide I've put up here I think you all have seen in some fashion. And, in fact you brought the electrical vehicle issue up and as you can see there's one in the garage there, so it has to deal with its implications. But what I wanted to remind you about this particular area is that there's a lot of activity going on, not only inside the home dealing with the structure itself as well as appliances and energy sources, but also things going on outside the home that are in the community.

The picture on the right there is part of our Irvine project that looks at Net Zero Energy homes as well as its implications to the grid and its stability. And as you know, there are a lot of programmatic activities going on today. There's the emergent technology effort that's going to interface with the Net Zero Energy, there's the Codes and Standards work which we're discussing today, there's the workforce education and training activities that also influence how we're going to implement this particular program.

But I just wanted you to keep in mind not only is Net Zero Energy the topic for today, but it's implications in other parameters in which the state is involved with, and the integration and coordination of those policies, I think are key important and it's something that the IEPR is supposed to do.

As we wrestle with the question of definition of Net Zero Energy I've identified three basic parameters that I think you should like to consider. And other people I've heard today have other options, so it's definitely something that we will examine as we write our comments for you later on this month. And perhaps we want to reserve the right, if there's another idea we want to off to you we will do that in the future.

But first of all we'd like to recommend an asset-based definition that requires all cost effective energy efficiency and demand resources be achieved in the building to perform. And that ensures that the grid stability and reliability are part of that equation. This notion of flexibility and the option of equivalency for meeting energy is pretty important too, and it's

something that you're definitely going to have to wrestle with in what it really means in terms of equivalent production and consumption of energy.

Next the definition should allow for flexibility to encourage the most cost-effective blend of both supply and demand resources. It's definitely going to be a competition that will take place at the home or at the building in how either the designer or the owner or the occupant wants to select their supply and demand resources in achieving those activities.

But one thing that we're going to recognize, and I think you recognized it quite early in your discussion here this morning, is that the impacts on the grid stability and reliability of the grid are going to be an important factor. No longer are homes and buildings just an independent stand-alone device or structure. But they're going to be an integral part of what the system looks like going forward into the future.

Finally the Net Zero equivalent option would allow all buildings, including those with limited potential for onsite generation, to participate through the utilization of offsite

renewables or renewable offset credits or tradeoff from transportation. So that's something that you're going to have to wrestle with of how you, in fact, incorporate those equivalent basis for that.

And with that we've identified at least five guiding principles that we would like to offer your consideration. We think the principles are important not only because they identify the items that you have to wrestle with, but it actually services as a guidepost for you as you go forward and implement these particular activities. If there's tradeoffs to be made between one principle or another.

As you wrestle and debate those standards you're going to adopt, in a transparent process we can actually see how you're weighing those particular criteria and those principles, so we can either support something like that or argue on behalf of another principle that we wanted to have more emphasis on. So we'd like you to kind of take these five principles into your consideration as you look.

And the first one is that to maintain grid stability on our local and system, and

reliability in our system-wide. I don't think you're going to want to implement devices that are going to cause grid instability. And examples of that come up all the time. I mean, look what's going on down in Southern California in the workshop you had on Monday. Reliability was paramount in that discussion in terms of how you would develop pilot programs and how you would develop energy efficiency or demand response programs to solve problems down there.

The second principle we'd like to offer for your consideration is that you look at fair, equitable, and affordable rates for customers. That gets into Time Dependent Valuation analysis a bit, but it's definitely something that you're going to have to wrestle with. We're going to have to know how you trade off participant activity versus nonparticipant activity in these particular programs.

Next we'd like you to extend the performance and efficiency standards to include all supply and demand side resources initiated in Net Zero Energy homes. You wrestle with that today when you deal with your appliance standards, so as you look at what kind of supply

resources you're going to have it's definitely a legitimate question to say what standards of efficiency and performance should we require out of these devices, so that we can ensure that in fact they're going to be available to us going forward.

And then fourth, we encourage the synergies of technology. For example, we can have demand response, energy efficiency or demand response DG or even demand response appliances. And if they're going to be part of the operating grid they should support the stability and reliability of that grid going forward.

And then fifth we'd like to offer you're your consideration is a prioritization of the most cost-effective means of meeting greenhouse gas emissions. I think that's something that you're going to have to wrestle with, ultimately the Net Zero Energy home is not only dealing with energy efficiency goals of the State of California, but also greenhouse gas requirements.

So with that I'll leave those for your consideration and we look forward to any discussions or questions in the future. Thank you.

COMMISSIONER MCALLISTER: Thanks very much, Manny. I appreciate it.

MS. KORESEC: Yes, all right so we'll open it up now for any questions in the room for our first three presenters. If you want to go ahead and just come up to the center podium, identify yourself.

MR. DAY: Good morning Commissioner McAllister, staff and fellow usual suspects.

One of the things that came up in the first presentation I wanted to pose it to the presenter, was that the onsite renewable energy would be valued at TDV and anything that was offsite would be on a Btu basis. And I'd like to suggest that maybe we look at an alternative or suggest something here.

You know, obviously there's something that's been coming out from the IOUs that onsite renewables are imparting a pretty substantial operational burden in terms of stability and reliability. There's a need for balancing, it has to be this is a cost that's being transferred to rate payers, we're all pretty familiar with the duck curve now being a really substantial impact from PV penetration.

One additional compliance concept might be to be able to bank credits from storage that would be located. It may be a district, it may be it's a demand control area within the load pocket. I think getting down to the individual circuit or substation might be a little bit tough. But what you might be able to see are third parties installing storage say at a mall, at a large office building, that are able to be dynamic and dispatched enabled to meet balancing demands.

If those could be valued on a TDV basis and those TDV credits banked then you'd have a competition on a market basis between putting PV on the houses and purchasing these credits, these basically grid reliability credits for lack of a better term that would also be based on a TDV basis.

I don't think that those TDV sales would be the only revenue stream that would allow somebody to go in and put in say a thermal energy storage or who knows what next technology comes out. But it could be an important revenue stream that when stacked on top of others could encourage more storage, more local storage that

makes everything else work. And I think there's a really good argument to giving locally-based storage banked credits, a TDV treatment as opposed to Btu. And I'd be particularly interested in what the 2030 person would feel about that as well.

MR. MAZRIA: And I think it's an interesting concept to explore. You know, we don't know what's going to happen with storage capability between now and 2020. And that's a very interesting concept that I think is worth exploring, so essentially you would get the TD Value even though you would be importing it from offsite of someone else develop that capacity.

MR. DAY: Yes, I mean here the example would be you build a new housing development at Quail Ridge. And you have the choice between purchasing a PV to reach your ZNE goal or you could purchase the credits. And the credits might come from an office building 30 miles away where they installed a thermal energy storage system that had the ability to shift that much load and on balance the following TDV characteristics.

I think the important part about that

is, is that that thermal energy storage system should be dynamic. It shouldn't be a permanent load shift, it should be something that focuses on helping maintain grid stability, so that system operators could dispatch it as needed and provide a load following resource.

If you had that, there are so many societal benefits that flow from that I think that it would be appropriate for it to get the same TDV treatment for the energy on-peak energy reduction that it's providing compared to its off-peak charging. That it would make sense for that to be a competitive element to reach ZNE, because in essence you'd be trading instead of generating that energy on-peak as you're talking about with PV primarily, you'd be looking at backfilling it with off-peak resources, which are disproportionately clean and those that aren't clean are lower footprint than there are on-peak. And that again, aligns pretty much with the concepts of TDV.

MR. MAZRIA: Yeah, this is Ed again. Yeah, and thanks for the comment. I think many things may come out of this type of a meeting that makes sense and should be considered.

MR. DAY: Thank you, and Martha my name is Michael Day and I'm with Rockwood Consulting.

COMMISSIONER MCALLISTER: Thanks, Martha. Many of us, I think some of these topics are going to be in the staff presentations right. We're going to talk about the sort of staff proposal for TDV, so I think that'll also give rise to some good discussion that treats some of these same topics, but Manny wanted to make a reply I think.

MR. ALVAREZ: I guess, just Mr. Day's comment about the offsite thing, I just wanted to kind of reinforce that. I guess there are two parameters there that I see that relevant. One is the accounting for the credit in terms of offsite and locational, but the more important is being sure that the operation of the system can be done when something is 30 miles away from where the action is taking place.

So you want to account for that also, so that's an important parameter that you want to take into account when you're dealing with the offsite credits and how they're accounted for. So don't just look at the pure accounting basis in terms of many Btus or kilowatt hours were

produced and saved, but how the system was operating and needs to operate at that particular time.

COMMISSIONER MCALLISTER: Yes, so thanks for that clarification. I want to acknowledge Commissioner Hochschild who's with us now, which is great and I know he has a lot of interest in this topic. And we'll invite you at your leisure to make some comments.

And so again I'm trying to be surgical here today and adopt a definition. You know, I think we all acknowledge that there's quite a bit of contested ground kind of on the periphery here about how Utility gets some revenue from a building that doesn't actually purchase energy on net, for example. That's kind of a little bit of a question there, still and is really not within the scope of this particular discussion. Although I mean I think it's kind of relevant as an input, but we're not trying to make decisions along those realms. We don't have the authority or the brief to do that.

So but it is important to get to a definition that has some staying power and I think that's our really long-term goal here or

our immediate goal really here.

So George, introduce yourself?

MR. NESBITT: George Nesbitt, HERS rater. I'm a little confused, because I think debating the definition of Zero Net Energy or as we used to say Net Zero Energy, is the wrong question. Why? I mean, I think as we've seen all the presentations so far have said, "Well, let's use TDV."

I'm even more confused, because Andrew McAllister I think signed a proclamation from the Commission on One Sky Homes Net First new single-family, Net Zero Energy home in California certified under the Title 20. And I was the rater on that.

So a little HERS story, Public Resources Code 25942, I don't know sometime in the '90s, directed the Energy Commission to develop a consistent rating system. And in 1999 we implemented Phase I of the Title 20 Chapter 4, Article 8, Section 1670 through 1675 the Title 20 HERS Home Energy Rating System Regulations.

It was supposed to be followed by Phase II, which got delayed in this room and many of the usual suspects that are here today were here

five years ago when we debated the HERS rating system. And in December of 2008 the Energy Commission adopted the Phase II regulations, which included the definition of a Net Zero Energy home based on Time Dependent Value. The 2008 code home is the 100 and the 0 is Net Zero Energy.

Yet for five years I've been hearing we don't have a definition of Zero Net Energy or Net Zero Energy as well as other misconceptions about the HERS rating system. That it doesn't apply to new homes or it doesn't apply to multi-family. None of which is true, so we've had a definition in regulatory effect since September of 2009 for a Net Zero Energy home.

So that should be a done deal. I think the questions are really, you know, TDV, the issues with it, issues with the grid stability, net metering, rate schedules, grid stability, those are the real questions. You know, how do you market it to the customer, because a Net Zero TDV home not even necessarily a zero electric bill home let alone zero electric net.

So those are really the questions we should be struggling with, not the definition

which we already have.

COMMISSIONER MCALLISTER: I'll invite you to actually, either I guess Martha or Cathy maybe to talk about why we need to adopt a definition at some point, maybe during your presentations in your background you can talk about that?

MS. RAYMER: Yes Commissioners, Bob Raymer representing the California Building Industry Association. And we'll be submitting comments by the August 1st deadline and we'll also be joined by the Building Owners and Managers Association and the Business Properties Association, but a very short comment on the first three presentations and some comments that you raised.

We agree that on the liability issue there certainly can be some very clarity, there absolutely has to be clarity in terms of the code definition of ZNE, but the manner in which this is portrayed to the public is entirely different. And it can be separate and we can do a very good job of making it clear that a house that meets the code that we're going to have does not mean a zero bill.

And so as long as we can get over and we're having some difficulty within our own industry right now. We've got some early adopters that are moving forward and there is some issue whether or not that bill is zero. Well, it's not and it's not going to be. It can be very reduced etcetera, etcetera but we agree with the comments that Peter Turnbull and yourself had earlier. And we think both of these can be reconciled. It's just the definition that applies in the code and the definition that's used out to the public can be two very different things.

COMMISSIONER MCALLISTER: Well thanks very much, Bob. And I guess I would anticipate and hope certainly that some people that buy whatever we label these homes, you know, internally we say Zero Net Energy but maybe they're the green shot or something or who knows? Right, so whatever label works for the public but some of them would have Zero Net Energy or negative, would have net production. I mean if they're parsimonious with their energy or that's their lifestyle and then that's perfectly possible.

But it's just given the fact that you're going to have a lot of variability you can't promise that for everybody and then you create some funky incentives there, so we need to be clear with our definitions and it's all for the good. So thanks very much.

MS. KORESEC: All right, I think if that's anybody else in the room with a question. All right, I would like to give the people on the phones a quick chance to ask any questions if that's all right with you, Commissioner. Okay, let's go ahead and open up the phone lines.

All right, do we have any questions on the phone?

MR. GOFF: Yes, this is Christopher Goff from the Gas Company.

MS. KORESEC: Yes Christopher, go ahead.

MR. GOFF: Thank you, in the second presentation it did say that ZNE would be, or there was a reference to it being exclusive of distributed generation. And that actually raises the point in my mind that I don't know if that's the Commission's viewpoint. And the reason I'm saying that is because obviously we have AB 32, we do need to cut greenhouse gas emissions. And

there may be some tremendous benefits for other players if we include DG in the definition of ZNE.

Just to illustrate, let's say a city has a landfill. Landfills do have fugitive greenhouse gas emissions, but if the city could recover the greenhouse gas emissions, clean up the gas, put into to the distribution system, transport it to their customers where they could -- or local customers who could actually use it in a clean, generating system you would get a lot of things. You would reduce fugitive greenhouse gas emissions from a landfill, the city could generate revenue, customers could help support the grid. And they could also potentially use waste heat to do applications that would normally take some type of fuel such as water heating, space heating or supplemental cooling.

So just to illustrate if we had a fuel cell running on biogas, in my mind that seems like that would fit the ZNE definition and if you look at some of the sustainability plans of the federal government they're actually very progressive. And one of the things that the White House and the Department of Defense looks

at is doing things like that, recovering landfill gas to supply energy to clean generating systems.

So I guess I'm really trying to get my arms around this issue about DG, because the strategic plan mentions clean generation in the residential multi-family and commercial sectors. So I'm just curious, the Energy Commission see clean DG fitting into the TDV definition or what is the viewpoint regarding?

COMMISSIONER MCALLISTER: So you're talking about DG that's not behind the meter of the individual customer, correct?

MR. GOFF: No, I'm talking at the facility, at the commercial building or a home.

COMMISSIONER MCALLISTER: Well, absolutely that is certainly contemplated within the definition of ZNE. That absolutely is there.

So I think probably the best thing is to move onto to the staff presentations, so that we can sort of get the state of this discussion within the agencies on the table and then that'll actually give rise to some discussion to flush it out.

MR. GOFF: Thanks for your attention, very much.

COMMISSIONER MCALLISTER: Thank you, thanks for your comment.

MS. KORESEC: All right, we have Martha Brook and Cathy Fogel for our joint staff presentation.

MS. BROOK: Hi, I'm Martha Brook with the California Energy Commission and we have Cathy Fogel here from the California Public Utilities Commission.

We have been working on this jointly for many months. I don't want to say many years, but it has been more than 12 months. And we're going to summarize what we've come to and the recommendation we're making for a definition for Zero Net Energy.

Cathy's going to speak to the slides and I'm going to chime in from a microphone at the desk. And I think that should work pretty good.

MS. FOGEL: Great, so I'm going to start with a little bit of background from the CEC's perspective primarily in terms of the adoption of the Zero Net Energy bill and goals. This will be a review for most of you in the room, but so be it.

Do I advance the next slide or how?

Okay. So the California Public Utility Commission, I believe following the Energy Commission, in 2007 adopted Zero Net Energy goals. In the decision in 2007 and then subsequently in our adoption of the strategic plan in 2008 the 2020 goals for all new residential construction to be at Zero Net Energy and 2034 new commercial construction to be Zero Net Energy.

Also in 2008 in the strategic plan the Commission adopted the goal that 50 percent of existing commercial buildings will be retrofit to ZNE by 2030. We also, this goal's been reinforced in a number of other state policy decisions and plans, which are listed on the screen.

It's also notably in 2012 the Executive Order B-1812 adopted the goals for new state buildings, and major renovations beginning design after 2025 should be constructed as ZNE facilities. Fifty percent of new state facilities beginning design after 2020 shall be ZNE. And state agencies shall take measures towards achieving ZNE for 50 percent of the square footage of existing state-owned building

by 2025. So I've seen really wide-spread support for the Zero Net Energy goals in the state.

In the California Long Term Energy Efficiency Strategic Plan Zero Net Energy was defined. There it was defined perhaps in a couple of different ways, which has I think helped create a little confusion over the years. But the primary definition offered as appears on the screen there, that the amount of energy provided by onsite renewal energy sources is equal to the amount of energy used by the building.

The metric was not specified though, how do you measure this energy? That was one omission in the plan. I think in different text elsewhere in the plan there was some mention of a zero bill. This definition, this graphic offered here includes that embedded energy might be able to contribute to it. So there was a little confusion as can happen, but it did clearly indicate that the definition was intended to apply at the level of a project seeking entitlements and permits. So I think that's important to remember. From the start in the PUC's mind this was potentially a definition that

applied beyond a single building.

The CPUC subsequently initiated a number of action plans to move forward implementation of the strategic plan. One of the first to be launched was a commercial Zero Net Energy Building Action Plan in 2010 or '11, that was launched. And out of that previous ambiguity I mentioned a Zero Net Energy Definitions Group arose and decided to try and tackle this definitions issue. So about 20 participants took part in that, many of them are in the room here today from Utilities, leading advocates for Zero Net Energy, government agency staff and others, nonprofits, the CBIA took part.

And the intent of the group was to come up with a simple and short definition of Zero Net Energy buildings. And the challenge was to keep a common-sense definition that made sense, but also could be applicable to all buildings. The same issues we're discussing today that Ed introduced. And a key finding was that the definition of the Zero Net Energy and the policy goals had to be addressed together. And I believe, as I mentioned, many of the participants in that group are here today.

So the proposed revised definition that came out of that group, which was essentially a consensus proposal -- it was not fully supported by all members of the group, but it had large support. Was similar to what we're seeing today, that the societal value of energy consumed by the building over the course of a typical year is less than or equal to the societal value of the onsite renewable energy generated, so again pointing towards the TDV metric.

I think Martha, you were perhaps going to speak to this?

MS. BROOK: Yeah, so and then because we do, I think we have a mandate to get to Zero Net Energy in the building standards we feel like there's a pressing need to formally approve a ZNE definition, which is why we asked for this to be in the IEPR and to move forward.

We are already underway with development activities for the next standards update. So the 2016 standards needs to make a significant progression towards Zero Net Energy. And in order to do this, you know, we need to establish the Zero Net Energy level of energy performance.

First in the Green Building Standards,

which is a beyond code voluntary portion of the California Building Code and it includes an energy chapter in there. And since we only have two code updates to get to that 2020 goal the beyond code level of energy performance needs to include that in the very next update. And we have to be able to define what we mean by Zero Net Energy in the code in order to set that level of energy performance as a requirement for a beyond code level of performance.

And this will actually result in a Zero Net Energy definition being published in the California Building Code, because we want to establish what we mean by getting a home to this level of energy performance.

The other thing that's really important, and I'm guessing most of us in the room know, but we really depend on the Utility new construction programs to lead the way to more and more stringent building codes. And so they really need to be demonstrating and incenting the Zero Net Energy of performance today. Just like Ed was saying, we need to really be getting to this level of performance as quickly as possible in order to mandate it in two more code updates.

And they need a consistent definition that they employ in their incentive program that's consistent with a code definition, because they're trying to move code forward in their new construction programs.

COMMISSIONER MCALLISTER: Well one thing I would just add actually is, you know, we've certainly in the code as it applies to alterations, but I think also just in the new construction industry itself that the code is getting pretty complicated. And parallel there's a need to simplify in a way and sort of make it more usable. And I don't mean that in any sort of coded way, I mean that in the sincere, "Give people a clear target, so that people with good intentions can comply with code and not be in the dark about whether they're really there or not."

And so doing this within that bigger process of updating code to be more aggressive and simpler are just it's not clear how the pieces of that puzzle really do fit together. And it's going to take a lot of really hard work, I think from all stakeholders to come to the table and work that out.

So I know we're already getting on

board, staff is already convening around the 2016 standards sort of I think pretty much understanding what the lift is and it's not small. So in that context we're having this ZNE discussion.

MS. FOGEL: As Martha mentioned as agency staff we've been having these discussions following, I believe the 2011 or '12 IEPR that recommended that our agencies work together, and recommended a societal value metric. So we've been working since at least November of last year and this is a proposed definition that we came up with. It really modifies the primary definition of Zero Net Energy buildings in the California Long-Term Energy Efficiency Strategic Plan. And the changes to that definition are noted here in italics, so I'll just go ahead and read it.

"A Zero Net Energy Code Building is one where the societal value of the amount of energy provided by onsite renewable energy sources is equal to the value of the energy consumed by the building at the level of a single project seeking entitlements and building code permits, measured using the California Energy Commission's Time Dependent Valuation metric. A ZNE Code Building

meets Energy Use Intensity," I believe targets was omitted there, "by building type and climate zone that reflect best practices for highly efficient buildings."

So again we came to this as essentially a building on what had gone before. And in the course of the PG&E study and our discussions, we really focused a lot on the importance of maintaining the focus on energy efficiency as the foundation of ZNE buildings.

So of course the Utilities are mandated to pursue all cost-effective energy efficiency under PU code and statute. We're mandated to oversee that process and it is essential in reducing costs for most ZNE building types. And so that results in the second sentence here that Energy Use Intensity targets. And we've heard several presentations today that talked about HERS being a way to potentially measure and communicate those targets. Certainly that would be an obvious approach here.

MS. BROOK: Okay, so the Time Dependent Valuation of energy, it's a mouthful and but it's important from the code perspective, because it basically allows us to meet our mandate of

delivering standards that are cost-effective for the consumer. And also consider the full costs of energy for the State of California.

So it accounts for the avoided costs of future energy generation, transmission, distribution and delivery of, and the greenhouse gas emissions that are part of that system, expected over the 30-year life of buildings. It includes the existing infrastructure costs paid by the average consumer. It values both energy generation and efficiency more on-peak than off peak, consistent with California system costs

COMMISSIONER MCALLISTER: Hey Martha, can I ask a clarification? So the 30-year or assumed lifetime of a building is 30 years in the TDV?

MS. BROOK: Yeah, our life cycle costs methodology is a 30-year time period, yeah.

COMMISSIONER MCALLISTER: Thirty years okay, yeah even though we know that many if not most buildings would actually be here longer than that. But that's sort of the end result.

MS. BROOK: But this is not, this is only set in stone for each code update. The very beginning of our code update we vet a life cycle

cost methodology and the Time Dependent Valuation update. In that process we can adopt any life time that we choose. At least as long as I've been here we've set it but you've got a very good point, in Europe and other places they're arguing over whether it should be 50 or 60 years.

COMMISSIONER MCALLISTER: There are 500.

MS. BROOK: Yeah, so it's a very good point and you could say that we're being conservative in our ability to get the energy efficiency and renewable energy into the code by that 30-year life assumption.

COMMISSIONER MCALLISTER: Yeah, I'm not making a value judgment on where I think it should be longer than that for purposes of analysis. I just, that seems like a reasonable horizon for a life cycle cost analysis. You would expect the financials to sort of work out at some timeframe that presumably would be less than the actual average lifetime of the building.

MS. BROOK: Yeah, and actually I think that where we've landed on 30 is that's the typical mortgage time period.

COMMISSIONER MCALLISTER: Right, okay.

MS. BROOK: And so that kind of factors

into the equation, because we're thinking of this from the consumer perspective. And they're going to be paying for this efficiency through their mortgage.

COMMISSIONER MCALLISTER: Also that's the shell of the building, the building, the basics of the building, those lifetimes are likely going to be different than say, we have to then talk about, "Okay, well what's the lifetime of each of the measures and all that kind of stuff, right?

MS. BROOK: Right, right.

COMMISSIONER MCALLISTER: Okay, good.

MS. BROOK: Now the other thing to note about the way that we develop our Time Dependent Valuation of energy is that we look at both the current snapshot of what the grid looks like, and therefore the grid costs. And we also look at a future snapshot, best estimate of what we think the future grid in 30 years is going to look like. And we basically value both that whole trend between current costs and future costs, so we bring those forward and then that present value type of a calculation to quantify the system costs over that 30-year time period.

So that's important, because we know that the costs are going to change and that the generation costs and the transmission, to be different in the future, because of all of our other policy goals.

COMMISSIONER MCALLISTER: Can I ask, how often is TDV updated with sort of new projections, you know? We've just been through a few years where the way the resource mix has begun to change drastically and it's going to continue to do so, and the hourly costs on the margin are going through some pretty tremendous change and it's important to kind of keep up to date with, so how often --

MS. BROOK: Right, right so we do at the beginning of every code update, so basically every three years.

COMMISSIONER MCALLISTER: Every three years, okay.

MS. BROOK: Yeah. And we did this time and the 2013 standards assume that our RPS goals were met and that at the end of that time period, the 30 years, so that -- and that was the type of system that we evaluated the cost on for the future that we brought forward.

So it's good and it's bad. I mean, the good part is we update it every three years. The bad part is we don't have a fixed metric that's always going to stay the same, and this has always been the case, so when I think it was Manuel from Southern California Edison brought up stranded assets, that's something that Building Code lives with and has always lived with. So we're not doing anything different; we will always have that stranded asset issue, but it would be just as problematic to never update expected costs.

COMMISSIONER MCALLISTER: Oh, no, absolutely. Absolutely. I think just this discussion kind of goes on steroids when you start talking about having sort of having it really truly be on the margin for the utility and new construction, and I think working through the issues of -- looking at ways to respect the infrastructure costs but also respect the home buyer and the business, you know, the building owner, over time, I mean, we got to juggle that.

MS. BROOK: Yeah. So the other thing that I would note is that if you look at -- if you use a time dependent valuation of energy

metric, the size of a PV system needed to meet a Zero Net Energy level of performance would be lower or smaller than if you valued that PV system generation with any other metric, because PV system generation is very coincident with PEAK and since we value PEAK higher in our time dependent valuation metric, you'd need less PV size to meet that same level of performance.

That's all I have, Cathy.

MS. FOGEL: So also in our agency discussions we discussed a couple of other terms. They've been introduced today as well. We're proposing these as additional different terms with different definitions and meanings.

The Zero Net Energy code definition I offered earlier is intended to cover all fuels, electric and gas, so the Zero Net Energy building term offered here is intended to offer a term that can help us be clear when we're talking to each other if we really are talking about a building that's just offsetting with the renewable energy the electric consumption in the building, that we call it something different, call it a zero net electric building, but that all those buildings meet the same EUIs for both

fuel types and that those EUIs are consistently set and adopted and communicated.

The idea of a Zero Net Energy ready building was again previously introduced and is essentially intended to mean buildings that meet those EUIs but do not have any renewables onsite.

MS. BROOK: I would just add on that zero net electric building term, the reason that's almost a paragraph long is because we think it's really important that if you're trying to claim that you're zero net electric, you can't just be at the expense of shifting all your use to gas, so that's basically what we're saying is that if you do choose to use gas and you want to get to that zero net electric level of performance, your gas use has to be best practice level of energy use intensity, so that's the intent of the second part of that paragraph.

COMMISSIONER MCALLISTER: Who would be using these terms?

MS. BROOK: Well, this is just all about what we were talking about earlier about the marketplace. You can't control the marketplace's use of vocabulary and things are going to spin in a bunch of different directions.

COMMISSIONER MCALLISTER: Right.

MS. BROOK: So that's why we sort of put that stuff in red at the beginning of the slide. We don't want to think of these as alternative definitions for ZNE; they're terms that are going to be in the marketplace. Let's all agree on what we think that they mean. We're not going to be able to say no, you can't use that term.

COMMISSIONER MCALLISTER: Oh, no, absolutely. That's not what I'm implying. I just think, like, you know, we don't want to be in a situation where there are -- it's not that we're trying to dictate vocabularies; I'm trying to think about ways to let the marketplace decide what it's going to be called. It's probably going to be none of these, right? I just want to make sure that this isn't our terms of art that we then expect to have play out there in the world, because I think that's unlikely and really undesirable, right. We just want to be defining code.

MS. BROOK: Well, that's true, but in the case where there could potentially be an incentive program around Zero Net Electric, if that is useful to the marketplace. We just are

asserting that it's really not fair to call it that if you've just shifted all your wasteful energy to the gas side.

COMMISSIONER MCALLISTER: Fair enough, yeah.

MS. FOGEL: I'll also add that I've talked to builders every now and then. They say "we're doing Zero Net Energy buildings."

Well, are you offsetting all the energy consumption?

No, we're offsetting the electric consumption.

So, it's proposing to have a term where we can say, well, we think that's a Zero Net Electric building.

COMMISSIONER MCALLISTER: I think it'll be really important to get stakeholder comments on this and really work through how this would play out, right, because it's going to vary along a lot of different axes, I think, as to what has traction and what doesn't.

MS. FOGEL: So this is backtracking a little bit. As I mentioned, the CPC adopted the ZNE goals in 2007/2008, and the Utilities subsequently incorporated these goals in their

codes and standards programs and their new construction programs and of sustainable communities, and in the case of PG&E, a Zero Net Energy pilot program.

Peter Turnbull mentioned two studies that PG&E funded: the technical feasibility of ZNE buildings in California by ARUP, and The road to ZNE; mapping pathways to ZNE buildings in California, by HMG, both completed in 2012. So some of the main takeaways there really reinforce the goal adopted by the State.

The ZNE, these findings here are from the technical feasibility study, which did most of its analysis using the TDV metric, found that for most buildings in California ZNE buildings will be technically feasible by 2020. The most challenging ones for which this was not necessarily found are the larger more energy intensive ones; hospitals, restaurants, large hotels, multi-family high-rise and large offices.

The study found that using parking lot space supports achieving ZNE for three of those more challenging types; the multi-family high-rise, large office and restaurants. And there's many assumptions in the study.

I encourage you to look at it directly if you haven't yet. At the end of the presentation is a link to how you can find it.

One of the assumptions is that it assumes rooftop PVE systems except in the case when they did additional analysis to look at how parking lots might support goals for certain building types.

It did include significant plug load improvements over this 2020-25 period.

And it did not evaluate cost-effectiveness, but PG&E is looking to use some of the data we're gathering for other purposes and try and add some of that to their work over the next couple of years.

As Peter mentioned earlier, one of the findings also looked at the need to update study ways for TDV to reflect peak shift and the value of energy exports. It's primarily intended to look at energy used or imported.

This is a nifty graphic. You either like it or you don't. It's from the technical feasibility study. It reinforces what Peter Turnbull said, which is the study found that for about 75 percent of California's building stock

expected to be built in 2020, that ZNE was found to be technically feasible by the study. This graphic kind of shows on the horizontal axis the projected numbers of different building types expected to be built, so warehouses, single family homes, multi-family, medium office, going all the way up to hospitals with single family and multi-family homes comprising the bulk of the expected square footage.

And on the other horizontal axis is the California climate zones, which indicates for using the TDV values how far away from ZNE each building type was. You can see in the far back in the deserts for hospitals there's a little spike. That's going to be one of the most challenging climate zones and building types to choose ZNE.

And on the vertical axis is a reflection of the additional energy reductions needed to reach ZNE using the TDV metric.

COMMISSIONER MCALLISTER: So from front to back the width of the bands, it would kind of nice to have lines there to know, but it looks like SoCal Non-Coastal is our kind of biggest challenge there; is that a fair statement to

make?

MS. FOGEL: Yeah, I think going towards the back, SoCal Non-Coastal, Central Valley, Desert, yeah, with a little blip in the front there for Bay Area and Mountains multi-family high-rise.

So this is indicative, and the report goes into more detail about the projected square footage for building type and the modeled remaining needs to get to ZNE using the prototypes used in the model, but it communicates that we have some significant challenges in some building types and a little bit easier path in some of the other building types that comprise about maybe 75 percent of the expected building stock in 2020.

This is a graphic that communicates, let's start with one of the findings or suggestions from the report by HMG, The Road to ZNE. Especially for non-residential buildings let's start with the easier buildings that also have additional reasons to go ZNE, such as state buildings and schools, warehouses and possibly consider the next code update as including a ZNE reach code or possibly a ZNE code; I'm not sure.

Let's let Martha speak to that if you want to add to that.

MS. BROOK: Well, I think that the red building type labels up there sort of indicate that we think that we can get to Zero Net Energy levels of performance in some of those easier commercial buildings before the end date, which is 2030, so that's one of the things we'll have to think about when we do our code update is if those kind of targets can be addressed earlier and we don't have to wait until the end of the goal period to set those standards.

MS. FOGEL: Some more recommendations from The Road to ZNE. Again, retaining deep energy efficiency as the foundation for ZNE buildings. An emphasis on looking at the grid impacts of the distributed generation requirements that definitely will be significant. These estimates here of up to 530 megawatts for rooftop PV per year for residential as early as 2020 assume all California homes can go to ZNE, which we know is unlikely to be the case. But it's a significant increase from our current rate of rooftop solar installations.

And also again this analysis assumed PV

was the only option. It's not necessarily the only option. Also the analysis didn't include storage or I believe demand response opportunities. But it's significant new requirements and implying by 2030 up to 5,000 megawatts PV just for the residential ZNE goals alone.

The report also recommended that the agencies consider defining ZNE equivalent buildings. It's been introduced today again that such a term and a building meeting this threshold could meet renewable generation requirements offsite.

Some other stakeholders suggest considering locational efficiency or water efficiency in defining this term. So that was a strong recommendation in this report and also was brought up in the ZNE definitions group that I mentioned earlier.

COMMISSIONER MCALLISTER: I just wanted to ask if there's been any discussion about how credits that might be purchased or generated somehow on behalf of a building for compliance purposes would fit into utility energy efficiency goals, because the utilities are within the CAP

sectors, right, so you've got this whole other market there, so potentially to help pay for this you could monetize the carbon value of aggressive measures and help with the transaction, help improve the profile, pay for some of the additional cost of the Zero Net Energy building. But then you cross some boundaries there that probably are a little tricky.

MS. FOGEL: Uh-huh.

COMMISSIONER MCALLISTER: So I wonder, again, we want to focus on the definition, but I think if we're talking about spinning out in some working groups on how to implement this thing, then I think that's probably one of them is to figure out mechanisms to make it attractive in the marketplace. So we talked about the labeling issue but we also need to talk about where the different components of this fall in terms of the policy that we already have. So anyway, tricky issues.

MS. FOGEL: Yeah.

COMMISSIONER MCALLISTER: Another thing I want to get to, an existing program that might be good for this as a model is the Carl Moyer Program where you have sort of entitlements.

It's a way to fund infrastructure investments sort of in a forward way. But I think I'm getting into a little bit of the weeds here, but I'm wondering if there's been any sort of practical discussion about how to do the accounting on the incremental measures that ZNE code would require.

MS. BROOK: We have not had those discussions to date, but we need to keep doing that.

One thing that I wanted to mention is that from the code perspective, I don't think there needs to be a separate definition for a ZNE equivalent. I think the nature course of code development, there's always exceptions to every requirement, so if there's a ZNE requirement, there will naturally be some exceptions where there's a good practical reason why you can't meet that requirement.

We would just define what is a legitimate exception to a ZNE requirement in code, so you don't have to jump around from definition to definition; there's just a natural code implementation that would implement what we're trying to accomplish with that alternative definition.

COMMISSIONER MCALLISTER: You know this better than I, but as long as we're not encouraging people to stampede toward the offramps, you know.

MS. BROOK: Right, and that's the issue we have with every code exception. And when you talk about simplifying code, that's a great way to do it is to limit the exceptions.

So anyway, I think that this could be needed for some of the marketplace spin. I don't think it's needed for implementing energy code.

MS. FOGEL: Yeah, I would agree with that. I can say and perhaps some of the utility folks here may like to comment on this.

I haven't seen or been part of many practical discussions on how to implement ZNE equivalent buildings, certainly not in code. The utilities have informally offered us a few ideas about how such an approach might link with incentives offered. They may choose to speak to those or not. They may not go forward; I'm not sure.

Anyway, carrying on here. Just as the final recommendations from the HMG report that the utilities should internalize the Zero Net

Energy goals in their portfolios. Support and learn from early adopter builders. And we need more real ZNE buildings in the marketplace to touch and feel and measure and emulate and inspire and etcetera. So there's a number of discussions staring to focus in that area with the utilities and CPUC.

And also to take a long-term view of cost effectiveness. We at the CPUC have some constraints on our cost-effectiveness approach that does not take a long term benefit to account.

So just some concluding thoughts here.

Our agencies at the staff level support the TDV societal value definition for ZNE code buildings for use of Title 24.

We think ZNE ready to be used as an energy intensity target or a HERS performance rating score. The utilities are talking now about linking their residential new construction building to EUI target starting as early as 2014, next year. And I think the details are still to be worked out in terms of what that means, what a target would be now that we're starting to merge our HERS score of 30-40.

And beyond that, builders can differentiate with respect to branding, add renewable, go ZNE, go zero electric and differentiate themselves in the marketplace, but we're talking about a technical target for the utility programs there.

Zero electric could possible also be shown in a HERS or perhaps a BEAR rating scale if it gained traction in the marketplace. It may not, as you point out, Commissioner McAllister.

And as Martha said, I think from the staff perspective we find that we haven't quite hit on the way how the idea of ZNE equivalent could be regulated via Title 24, so we think it may be best kept separate from Title 24, so we'll probably have a lot of discussion on that.

There's just a lot of variables that could be considered; location and water, offset renewable. Are these proposed to be included in 50- or 30-year binding contracts at the time of code or not. Are you talking about every year or five year HERS rater verification of certain claims? It hasn't been clear to me.

And we think that this idea may be a little bit more appealing to consumers as

occupied or living in a building already rather than as built. We can see how that plays out.

And again, now the ongoing oversight of renewables would be handled.

So those are some of the our questions about that particular terms and we welcome your questions.

COMMISSIONER MCALLISTER: Great. I'm really excited to hear what people have to say. I guess just a couple things to point out and then one question.

So I think in Cal Green Update and the 2016 there's opportunity to do it in a stretch way and sort of get some of these ideas out there and see how much they have traction in the marketplace, so I think it's a really great opportunity. I don't necessarily think we're ahead of the game here. We've got a lot of time pressure and the marketplace does not move -- well, it can move quickly, but I think certainly our process is fairly intentional.

I also wanted to just point out that if we can find a way, we're currently talking between the two Commissions about doing the joint update of the Long-Term Energy Efficiency

Strategic Plan and really making that a joint agency document, and I think that process might also be a way to push some of these ideas and really be clear across the board and consistent across agencies.

One of the issues is, as you mentioned Cathy, the cost-effectiveness and figuring out how to homogenize or -- I'm not sure what the best word is, but I'm not sure what the best word is, but figuring out how to be more consistent across agencies or at least be explicit about what our various statutory constraints are and then make a decision. In this context I think TDV makes a lot of sense. But potentially get each of our respective agencies working with the other's definitions in a way that is a little bit more integrated, I think would be a good idea. That way we wouldn't be talking two different languages all the time, we'd be really talking the same language, we'd just have more vocabulary. I think that's an improvement.

But I think it's a really exciting opportunity to actually get this stuff down operational within -- and get some clarity through the update of the Long-Term Energy

Efficiency Strategic Plan.

And then a question. With respect to the PUC, Cathy, is there any need or has there been a staff discussion -- certainly code comes through and goes through our process and goes through the Building Standards Commission and becomes the law of the land. Is there any need -- what's the pathway for some of this stuff to go up through the Commission, the PUC Commissioners? Does this need to reach an end point with them as well or is it just within the portfolio process as adopted basically?

MS. FOGEL: Well, the short answer is I'm not sure. Ii think as long as it's adopted by Commission decision of some type, I think that would be helpful, and is needed. And I think the updating of the Strategic Plan will probably not take precedence over the authorization of the 2015 through 17 utility portfolio, so that could slip. We may want to in that case try and indicate a more refined definition or support for this definition as part of the portfolio approval process for 15, but whether that's possible remains to be seen with the administrative law judge and the scope of the proceeding.

COMMISSIONER MCALLISTER: Okay. Well, so we should just get on whichever set of tracks, you know, put it on the right train to get it to the finish line. Okay. Great. Thanks.

So I'll open it up to questions from the public.

MR. RAYMER: Thank you, Commissioners. I'm Bob Raymer representing California Building Industry Association. As I said earlier, we'll be submitting comments for CBIA, BOMA and CBPA. My comments today, I'm going to be presenting questions and comments. I don't expect answers to these. Well, please on the spot if you can, but that'll be sort of the tenor of our presentation, and that is 10, 15, 20 years ago we may well have been beginning to serious question whether or not there should be doing, whether or not we would oppose it. That's not the issue. We understand the state has a policy, we understand there are goals in place. We have questions that need to be answered on how we get there.

So starting off, I'd like to indicate our strong support for a path to simplicity. We will always have the performance method out

there. That will be the lion's share of construction that gets done, but there's a couple of very obvious benefits to having some marketable packages, similar to those that are being developed by SMUD and others.

The first, of course, is that you've got a very clean and easy to understand path to compliance, but I suspect more importantly, particularly at this time at this juncture, having marketable packages that are easy to understand is a marvelous education tool.

As we've said earlier, we've got some early adopters out there that are moving forward rather rapidly and rather surprisingly. At the same time, there's still the vast majority of industry out there that's kind of getting their breath after the six to seven year downturn. They're trying to get back into the construction stream of things, and if they had something they could just visualize and understand, you know, this is how it's done, some of the fear and confusion that is out there just simply education that, you know, you don't have to do it this way, but here is one way to get it done, could be very helpful.

COMMISSIONER MCALLISTER: Can you -- so at what point would that engagement and that education need to happen? I mean, that really optimally would happen when they're laying out the lots, you know, when they've got the piece of land and they're orienting lots and figuring out what the infrastructure is going to look like before they even pour a foundation.

MR. RAYMER: The marketable packages don't necessarily need to be part of part 6 or part 11, and I think the Energy Commission has the ability just in the same way that the Division of State Architect and HCD has done for disabled accessibility. You know, there's a variety of ways to comply. It doesn't necessarily need to be spelled out specifically in the standards, but you can come up with these educational tools. And over the years, particularly in the late 80s and early 90s the Energy Commission did sort of anoint a number of packages. Matter of fact, at one point in time we had a whole lot of packages.

But getting on to the point here, we don't need to necessarily keep all this constrained to just the simple update and

adoption cycle that we go through, which is pretty rigid quite frankly. We've got about two years to get the work done prior to the next update. So having said that, there is enormous opportunity here to get the word out. We don't have to wait for an adopted standard; we can just simply -- I mean, SMUD is very close here and we don't intend to keep that a secret. As soon as this stuff is done we'll probably have a place on our website saying, hey, by the way, here's how to do it in climate zone 12, and one possible option.

Moving right along. In terms of the general definition of Zero Net Energy and the reference to societal value, we don't necessarily take issue with that; it's just that everything is always so intertwined with cost effectiveness and whatnot, and it's important to understand that in terms of mandatory standards, we market what is in the code, we market that to the home buyers as something that the upfront cost associated with compliance is going to pay for itself in reduced utility bills over the 30-year life of the structure. That has been the bread and butter of marketing of the energy efficiency

standards. Obviously, REACH codes may well be something else, but it is incredibly important that we, our sales agents be able to look the home buyer in the eye and say, look, you're going to get your money back, and that is a key marketing item. We don't necessarily make a big deal of telling them it's 30 years. A lot of people would like to get their money back in five or six years, but they are going to get their money back and that's an important marketing point.

We've already mentioned liability to the builder. That's a huge issue and we thoroughly support the use of a variety of different definitions. We just have to be very careful of the one that we're going to be using in terms of marketing overall to the general public.

Another question on how will PPAs be dealt with in all of this. Once again that gets back to liability issues or whatever.

We've got two major builders who have extremely different ways of marketing their near Zero Net Energy homes. One is basically purchasing the solar system and the home buyer is buying that and owning it. We have another huge

builder that is effectively utilizing PPAs through a third party entity. And how all of this gets addressed into this process is going to be a significant issue. It can be done, but we just have to be dealing with this up front.

In terms of the loading order, I realize this may well be controversial, but when I view the loading order I'm looking at it as a priority. Do your energy efficiency and then kind of move on, but not at all cost. Energy efficiency clearly is the priority, but it doesn't need to be an absolute rigid mandate that any and all energy efficiency be done before you consider solar. There needs to be an appropriate blending, if you will. And certainly as we look forward to the next set of standards we've already made it very clear we're looking for the use of solar as an option for compliance with the energy regs. There's a whole lot of benefits to that. Primarily, we're going to be losing our financial incentives from the state in June of 2016, and to the extent that we can somehow find other non-financial methods of promoting incorporation of solar, particularly in the smaller and medium size building industry, could

be very important. This is one way to do it. And hopefully we don't need to view the loading order as just this brick wall. It is something that helps us make decisions, prioritize energy efficiency, but not to the detriment of everything else.

Obviously, the plug load issue has to be taken care of, before I get into the Building Standards Commission.

We're very interested in how gas is going to be handled in all of this, and we certainly understand the complexities involved here, but you also need to understand energy efficiency and the Energy Commission is not the only game in town. We've also got the Department of Housing, and to a lesser degree the Building Standards Commission that is looking at mandatory EV charging station regulations. And whether it's July of 2015 or January of 2017, it's pretty clear we're going to have some manner of mandate for single family dwellings for EV charging ready.

And it raises the issue beyond energy efficiency to keep the cost at a minimum, to keep entry level housing affordable. We need to

understand that if we're going to have substantial increases in the electrical load coming into the house, that's going to have a huge impact on utility line infrastructure, in essence all of that stuff that happens outside the structure but within the project. In essence, are we doubling the number of pad mounted transformers?

Using gas helps offset some of that load that's coming out, and so we need to kind of keep all of this together, and I realize you've got a lot of moving parts here and that's why this isn't going to e an easy job to do over the next five to six years, but we want to help work this out.

Sort of concluding the comments, I don't want to spend a lot of time on it, but the Building Standards Commission with any agency, whether it's an adopting agency like the Energy Commission or a proposing agency like HCD or the Fire Marshall or DSA, all building standards have to meet a 9-point criteria.

Two of these criteria that don't get a whole lot of air play are numbers 4 and 5.

And by the way, for reference this is

out of Health and Safety Code 18930 where the 9-point criteria is printed.

Number 4 is "The proposed building standard is not unreasonable, arbitrary, unfair or capricious in whole or in part."

And criteria number 6, "The proposed building standard is not unnecessarily ambiguous or vague in whole or in part."

And this creates a not insurmountable problem but clearly a clear problem that when you're developing the definition and everything related to Zero Net Energy, you're dealing with a 50-55 percent of the energy load of the house that isn't regulated by the CEC but we're going to try to take care of that through ultimately coming up with Zero Net Energy.

Consequently, we're going to have to make some assumptions and we're going to need building standards that are precise and clear because that's what building standards are, but how you deal with that 50-55 percent that is not necessarily regulated by the building standards, we've got to make sure that it's clear that it's not arbitrary, that there's strong foundation for doing that.

And you've got a big problem because you can have two precisely the same homes built right next to each other to the same set of standards and the overall energy plug load could be substantially different.

So with that, industry looks forward to working with you over the next five to six years, particularly over the next year. We're very open-minded about how we go about this. We want it to be sort of a consensus arrangement and we look forward to partnering with you on this.

COMMISSIONER MCALLISTER: Thanks very much, Bob. And your last point, I really agree that figuring out what 'typical' means in this context, because it's essentially behavioral issue, so having a solid foundation for that, I mean, I think probably one of the topics here about how to get to a good end point on here is to dedicate some resources to studying this question and coming up with updated or current or just better assumptions on the half or so of the energy you're talking about.

MR. RAYMER: And one last thing. As with all of the 9-point criteria, somehow in this great scheme of things we're going to be dealing

with farmworker housing, we're going to have to be dealing with low and moderate income housing, we're going to have to deal witness apartments, which is sort of at the lower end of the bell curve in terms of housing pricing structure, but these are critical issues.

And as Martha said, you've got the ability with any building code to have exceptions, but certainly that may not be the answer for farmworker housing or low income housing, but we're going to have to figure out how to do this without crippling that upfront cost.

So thank you very much.

COMMISSIONER MCALLISTER: Thank you. I guess a question for staff on this. Has there been discussion about electric vehicles are in or out? Does our boundary for the definition include them or not? I would kind of assume not, but I wonder.

You know, for example, if we were to study the question of what the plug loads are, would we actually take those into account or not?

MS. BROOK: Yeah, so right now it's not, but that's just because that's an emerging market

that we haven't had to pay attention to in the past because there just wasn't enough of it to worry about, but that obviously is changing and we need to figure out. That's a huge plug just to add onto a long list of tiny little plugs.

But our agency did give the HCD some money to establish a working group to figure out what the right kind of code requirements should be for EVs, so that is getting worked on right now.

MS. FOGEL: I agree with Martha and just want to add that the utilities, Edison is in the process of putting together a study proposal for plug loads in the context of Zero Net Energy buildings.

A somewhat modest literature review has started and then going on to, I believe the objective is to try and better characterize plug loads so they can be reflected in both code and ZNE approaches.

COMMISSIONER MCALLISTER: All right. I've done academic research in that realm and I know that it can be rather challenging, but that's great to hear, that excites me a lot. It's a really key area going forward, I mean

really, so thanks.

MR. ELEY: Good morning, Commissioners. My name is Charles Eley. I'm an engineer and architect. I've been involved in code development for a long time, maybe 30, 40 years. I guess my affiliation today is, I guess I'm speaking for my children.

COMMISSIONER MCALLISTER: I want to actually thank you just for your long, long history in this arena. I mean, really quite extraordinary, so thank you for coming today.

MR. ELEY: Thank you. I've got several points. The first point is that building codes are fundamentally asset ratings, not operational ratings. We're looking at creating a building that's capable of being a ZNE building when operated in a way that we expect it to be operated.

So if I design an office building and my client leases it to a business that runs it 24/7 and puts a data center on three floors, clearly, that's out of the bounds of the asset rating. So we need to keep that clear in our definition.

I think for homeowners it's a similar kind of situation.

I agree that TDV is the correct metric for this, but as noted by Peter and others, it does change.

My perspective is that that change, though, is good. You know, if we achieve our goals and half of the non-residence buildings are ZNE by 2030 and all of our new ones, you know, the curve is going to shift. The maximum value for time-dependent valued energy is not going to be at 4:00 and 5:00 in the afternoon, it's going to shift to right after hours, it's going to shift to 7:00 p.m.

And that's in a way going to begin to address the grid issue to some extent, because the value, the time value that we place on energy is going to align with that.

There's a couple of boundary issues that I want to talk about. The first is the physical boundary.

By the way, I was on the advisory committee to Cathy and I agree with the definition that's being proposed, although it has about three or four times as many words as the one we originally came up with.

MS. FOGEL: That's government at work.

MR. ELEY: That's the way things work around here, I guess.

NREL (phonetic) did a very interesting paper a few years back and they identified four physical boundaries, A, B, C and D, and these kind of have to do with the location of the renewable energy systems.

A means that renewable energy systems have to be located on the building itself. B means that they need to be located on the site. C would allow them to be remotely located offsite somewhere. And D would open it up to the purchase of renewable energy credits and so forth.

I believe that the proper definition is B, and that aligns mostly with what we're talking about here.

COMMISSIONER MCALLISTER: Could you be a little more explicit? So you're talking about like a fee and tariff kind of arrangement where it's on the property?

MR. ELEY: On the property but not necessarily on the building.

COMMISSIONER MCALLISTER: Oh, but it's behind the meter? Anyway, too many weeds.

MR. ELEY: Yeah, but there are a few. I did some teaching last fall down at Foothill College and they have a campus of maybe 15 or 20 buildings and they have a campus level PV system of 1.2 megawatts out over the student parking area that's not associated with any one building, and through exceptions or something we need to account for those kinds of campus level PV systems.

And then also another issue that we may want to deal with through exceptions is the concept of virtual meters. We don't expect each condominium in a large building to be Zero Net Energy, we expect the building to be Zero Net Energy and we do that by wrapping a virtual meter around all the individual condominiums and then having the PV system on a separate meter that's within that virtual meter, and we show that ZNE is achieved at that level.

This could also extend maybe to school districts and other things, but I think these are exceptions. I think we should keep the definition pure.

The other boundary issue is not a physical boundary but it's a boundary issue

around which energy, how much energy is included in our definition of ZNE.

You know, we had a lot of debates about this, about whether transportation energy ought to be factored in, about where the water energy ought to be factored in or the embodied energy of the building itself ought to be factored in.

I've come around to believe that they should not. You know, we should be looking at the building itself, but all of the energies that enter the building; gas, electricity, chilled water, steam if there's a campus system, all of those need to be accounted for.

And that's not to say that we shouldn't strive for ZNE transportation systems or ZNE water systems or ZNE material resource, but that's a separate issue. Here we're talking about ZNE buildings themselves.

But as soon as we start talking about all of the energy, then this does raise some policy issues. I know we're not supposed to talk about rates today.

COMMISSIONER MCALLISTER: I thought I'd just try.

MR. ELEY: But I have to say a couple of

things.

You know, if we apply the test to all of the energy that enters the building, then the electric systems have to be net producers to make up for the gas use that's used or the chilled water or steam or other uses that are used, and our tariffs need to accommodate that in some way.

I mean, you know, we put a lot of time and energy into time-dependent valued energy and it would be terrific if our rate structures were emulated the TDV rates more. I think that would kind of close the gap and speak to some of the things Bob Raymer was bringing up.

I guess the next point is, those of you that know me know that I've always been an advocate for performance standards. I think the EUI targets are fine, although it could be in a few years that it's cheaper to install PV than it is to take us to that next level of conservation.

At some point, and there was a graph up here that showed the lines crossing, and I think I'd rather just leave it open to designers, to builders, to owners, to contractors to decide the most cost effective and easiest way to get to Zero Net Energy and not try to be too

prescriptive.

I know the EUIs are not exactly prescriptive, but we're sort of drawing the boundary between conservation and --

MS. BROOK: Uh-huh. But the problem is, in my opinion, we were trying to do that so that it would be a cost-effective solution for the consumer and that it wouldn't be, you know, an inefficient building with a ton of solar on it, so that's the alternative that we were --

MR. ELEY: I understand.

COMMISSIONER MCALLISTER: Well, but if solar is actually cheaper than, I mean --

MS. BROOK: Yeah, that would be a lovely future to become a reality.

COMMISSIONER MCALLISTER: Yeah, exactly. But I think --

MS. BROOK: I think, I just want to -- we've done the analysis and we're not there yet or not even close, so that's part of what staff's asserting is that let's not just assume that that is already a reality.

COMMISSIONER MCALLISTER: No, no, and I'm not. I mean, that graph was the way it was for a reason, but there are some apples and

oranges kinds of things here that the transaction cost. I mean, new construction is quite a bit different. Obviously there are different markets from existing buildings. But there are different market issues and in some ways that incremental energy efficiency has different and probably more stakeholders and we have to work through each measure independently.

So I'm not arguing for one approach or the other, but I just think that flexibility is important. I mean, Mr. Eley has described essentially this future utopia we hope to get to where the societal cost and rates match and send the right signal up and down the food chain, and that would motivate the right behavior and then we don't have to make these compromises.

And that is actually a long-term policy goal is to try to get time-dependent rates, right, but again, we're not there yet and we're going to have to have this discussion so we can know what the heck we're talking about and keeping it as simple as we can.

MR. ELEY: Just a couple of last comments and then I'll sit down and let other people speak.

But the definition for ZNE ready that I saw seemed to only say that we needed a building with a low EUI. I think conceptually it seems to me that you've got a tall slender apartment building in San Francisco with 50 stories and it's got a low EUI, but there's no roof space or no place to install PVs. Calling that ZNE ready is a bit of a problem.

So we have to -- I think there needs to be two things. I think there needs to be a low EUI, but there also needs to be adequate space on the roof or in the parking lot or someplace for the renewable energy systems.

COMMISSIONER MCALLISTER: Would you suggest some kind of an offset program or some kind of a place where --

MR. ELEY: Possibly, yeah. I think buildings like that are going to have to --

COMMISSIONER MCALLISTER: Is that part of entitlements that there's some process to get there that's not necessarily all onsite but that could be counted somehow that's formal?

MR. ELEY: Those are the tough buildings. In Cathy's graph those were the ones on the right side that are going to be hard. And

the (inaudible) study and an earlier study by NREL in 2007 both identified those building types as being a problem.

And the interesting thing, I didn't see too much sensitivity in terms of climate; it was mainly building types that were the problems here.

And then the last comment is the definition of Zero Net Electric. I don't find that very useful. You know, I see that as being some options to kind of circumvent things by shifting energy use from gas to electricity by using absorption cooling systems or gas engine driven chillers or (inaudible) generators or --

MS. FOGEL: Yeah, I think you might just needs the gas, yeah.

MR. ELEY: -- or what have you, so I think we have to be very careful with that definition.

Anyway, Thank you very much. I appreciate the time.

And I agree with my friend Ed Mazria. I think California really is, the whole world is looking at what we're doing and we want to get this right, and I think we are, so Thank you very

much.

COMMISSIONER MCALLISTER: Great, thanks for coming, appreciate your being here.

Mike.

MR. KEESEE: Good morning, Commissioners. My name is Mike Keesee. I'm a project manager at the Sacramento Municipal Utility District, SMUD, in our Research and Development Unit. Thank you for the opportunity to speak. I'll try and keep my comments as brief as possible. I just want to provide a little bit of background of SMUD zero energy experience.

We've been doing this since the year 2000, motivated by the 2001 energy crisis. I remember that one well. We partnered with the National Renewable Energy Lab in trying to develop highly efficient homes with the aim of introducing solar PV into the production home market in residential new construction.

We were guided by a very simple principle in developing our projects, which was the definition NREL offered at the time, which was a home or a building is zero energy if it produces as much energy as it uses on an annual basis. We understood at the time that that was

perhaps simplistic and a very hard goal to reach. And in particular from our utilities point of view our main concern is the cost of providing power, which is driven by our peak demands. We have a load factor somewhere around 40 percent.

As a result, we adopted a source energy definition where we tried to develop homes that used 80 percent less source energy on an annual basis, and NREL helped us develop that.

Bob Raymer alluded to some of the packages that we developed. One of those packages actually evolved into our Solar Smart Home Program, which is our current residential new construction program which was a very simple prescriptive list of energy efficiency measures that we felt confidential would provide at least 60 percent reduction in the electricity use, and that was our main concern there. Plus, you had to have a certain amount of PV on the home, minimum of 2kw.

We've evolved that looking at because we knew that the codes would change, that these would soon become obsolete, so speak, or the code would catch up, which they have. The new code, by the way, is now a Solar Smart Home (inaudible)

and a PV, which is a challenge for Mr. Raymer's members.

So the home of the future, as we called it, the 80 percent source reduction, is now what we're seeing as the new new construction program for the 2013 goal. And for HERS index, that's somewhere around on the efficiency side, 50-30, depending on the home. You add the PV, I can get pretty low. You get into the teens.

We have one builder in the ones.

We currently have three projects, three subdivision scale projects underway as we speak, under construction, that are meeting this 80 percent energy reduction goal. Another reference, that's about 45 to 50 percent north of the current Title 24, 2008 standards.

I urge you to take a minute and come down and look at them, see what they're like, and more importantly, talk to the builders that are building them, because they have their own insights on why they're doing this, as it were. I'll allude to that in a minute.

But the reason I'm up here is to say that in principle we like the time-dependent valuation approach, however, we're concerned that

this does not match SMUD's time-dependent valuations for our system.

It's important to keep in mind that we are our own control area. Our peak is different than the statewide peak. Our costs are different than the IOU's or the ISO's. As a result, we're concerned that using the current standards or the current TDV definition skews things dramatically, at least from our point of view. We're a late peaking utility.

COMMISSIONER MCALLISTER: How different are they? I guess you really don't say that.

MR. KEESEE: Well, that's a good question, Commissioner. We share with your staff what we think the TDV numbers are. They don't match our load profiles at all. In fact, I don't know how they'd match any utility load profile, from my experience.

Now, I may just be looking at them wrong. I'm not an engineer, I'm just a guy, you know. I'm just a simple guy, exactly. I'm just a caveman; that's my thing.

We'd like to explore that more with staff and I think that discussion has started. We would like to develop our own TDV, we're only

in climate zone 12.

The other concerns are these heat storms which we just came through is what drives our cost, and you look at any utility load profile. It happened to the ISO, I'm sure. It just grows and it grows and that's not reflected in the TDV calculations currently, at least not what I see.

I see a spiked peak day for the current file that Patrick sent me was September 1st. We're never going to peak on September 1st unless, I don't know, something happens that's beyond belief, you know.

We peak in July. We will continue to peak in July forever, until the climate changes, and it'll probably just get worse.

The other thing is that we are driving towards the carbon free generation resource. Our current goal is 90 percent carbon free by 2050, and that we don't think it reflected in the TDV either.

So we would like to work with staff to develop a TDV for our climate zone.

And the other thing I'll just mention is we are going to adopt and apparently we have a rate proposal right now that will institute time

and use rates for our customers in the near future. I think it's scheduled for 2016 if it's adopted by the Board of Directors, but it's in discussion. For residential, mandatory. And that time and use will be 4:00 to 7:00 p.m.

COMMISSIONER MCALLISTER: Oh, interesting. Okay. And then also, I understand you're developing rates or maybe already have them where there's a pretty significant fixed charge.

MR. KEESEE: Correct. And that's going up as well, that's in the current proposal as well. It's currently $10.

COMMISSIONER MCALLISTER: Okay. That definition goes to this point of Zero Net Energy versus zero net bill, you know, sort of customer perception versus societal value overall. I mean, those two things really don't match up and I think we just need to be very careful about how we turn around and look outward with this.

MR. KEESEE: So that's the main point I put. The last point, which is the obvious one we've talked about, is I talk to the public a lot with the demonstration projects I manage, and they have a very clear fixed idea in their mind.

I think we all know what that is, which is a zero bill. They love nothing more than not paying a utility bill.

COMMISSIONER MCALLISTER: You're not just a man, you're The Man.

MR. KEESEE: That's right; I wasn't going to say that.

MS. BROOK: I think caveman...

MR. KEESEE: And for experience, I think the idea of having a market driven definition, which the builders will adopt however they want to do it versus a code one is going to make sense, you know?

And I would just point that the Japanese in their home building market, from what I can tell, I don't read Japanese very well, they've been doing this for at least 2000, but they very different consumption patterns, although their use is probably close to the California use, and they build houses very differently, and they are all electric homes for a variety of reasons.

So that's what we have. And by the way, we at SMUD are happy to share the data we have from the projects we've done, including we've looked at grid impacts of high penetration PV.

We're currently doing that right now as I speak, including storage out of the Anatolia subdivision.

I can just tell you from the research I've done, I've never seen any impacts of PV on the grid. We have a unique distribution system, however.

Thank you very much.

COMMISSIONER MCALLISTER: So let's see. We do actually need to be out of this room at noon, so I think does somebody else have the room after that?

MS. KORESEC: Yeah, there's another workshop this afternoon, yeah.

COMMISSIONER MCALLISTER: Another workshop starting at noon, so we've got to be out of here.

MS. KORESEC: Yeah, so we need to kind of move through the comments a little more quickly, if possible.

COMMISSIONER MCALLISTER: Could folks raise their hands of who has comments that they want to make. So we're going to have to sort of limit these. I think we have some phone comments, as well.

MS. KORESEC: Yes, we have six people now on WebEx who want to make comments.

COMMISSIONER MCALLISTER: Okay. So we're going to have to limit it to probably a couple minutes. I'm sorry, guys, but let's just try to clip it on through here.

MR. HODGSON: Mike Hodgson from Consul. I'll be very brief, Commissioner McAllister and staff, as well as audience members.

My comment generates also in my comments on the AB758 workshops is really this is a leadership role for the Energy Commission to come forward with marketing. For ZNE to succeed at scale, we need the market acceptance, and builders will tell you that if the public demands it, we'll build it, so currently we have a market problem and that is the public doesn't demand it.

So as Peter Turnbull already mentioned, that if you mention ZNE the attendance and the interest all of a sudden goes up because it's quite an interesting topic for people to center around.

But if you look into the market, the only few builders who are marketing zero energy in today's market are actually marketing zero

bills, so what your definition and what the market is doing is two different things and we need to align those.

I would like to complement Ed Mazria for always bringing up the big picture and also giving us a potential feasible economic solution, and so there's kind of a challenge here for the Energy Commission now to see if the Governor's Office wants to give us tax credits to build ZNE buildings.

And I think that's a real request. I think if the Governor's vision, which is what the 2020/2030 goals really kind of started from our governor's office, is if they're sincere, and I'm not doubting that they are, an economic stimulus would be a huge help and I think Mr. Mazria's comments are right on point there.

Last comment is, we've heard reference and seen reference today to the HERS Scale. The scale is a very important scale either whether you're trying to identify where you are or where you want to go.

And as we mentioned, our market, the California market is built by national builders. Forty percent of the buildings here are built by

people who are not headquartered in California, and so we need to align that HERS Scale with the national scale. I'm not saying they have to be similar, but we have to have that dialog, we have to have that crosswalk, and we need to improve the HERS Scale in California so that national builders can use it and market to it.

Thank you.

COMMISSIONER MCALLISTER: Thanks, Mike.

MS. FOGEL: This is Cathy Fogel from CPC. I'll just observe for the sake of stimulating offline discussion that the utility approved new construction program budget for '10 through '12 was 65 million, which oddly enough is just about what was implied by Mr. Mazria's proposal.

MR. NANAMUTI: Good morning, Commissioners. I'm Ron Nanamuti from Avery (phonetic). Just wanted to bring up a couple of quick points. I think Charles and Mike and Bob covered a lot of really good areas.

As we look at society value as a guiding principle for ZNE, one of the areas that comes up is always demand response, because demand response at the building level has a huge

societal value.

Now, the question always comes up about how that gets translated to code. I don't have an answer but that's a consideration.

And also, as we started looking at what we're trying to do here is take operational efficiencies over a 30-year period and absorb that on the front end as a fixed point in time, and so a lot of the issues with the distribution level challenges that come up need to be sufficiently somehow absorbed into the TDV side, too.

The other item I'd like to bring up with respect to TDV and the code itself is how we treat new innovative technologies, because given the fixed code cycles, if there's new technology coming out of a lab today, it might take possibly the earliest code cycle it can get incorporated is going to be the 2020 cycles.

so we end up with a very long timeframe for adoption of new innovative technologies, which in other areas of the country such as Arizona where I think 55 or 60 percent of the homes are energy star rated now, so that area is actually by far the highest density of energy

star homes in the country, and builders have been able to adopt new technologies at a much faster pace.

So it's an interesting question to answer on how we can accelerate the adoption of new technologies.

COMMISSIONER MCALLISTER: Thanks for your comments, and as we were going through the presentations I actually noted down "demand response, demand response" several times, and I agree it's got a lot of potential societal value.

Also, I mean, and really more important even for me is potentially having it built in to narrow the gap between what we've been talking about, the societal value and the impacts on the grid and the utility concerns about Zero Net Energy, because I feel like to the extent that homes can provide services, ancillary services, to the grid it potentially resolves at least some of these issues and helps us narrow the discussion a little bit, so I appreciate your comments.

MR. NESBITT: George Nesbitt, HERS rater. Several things.

The PV peak is earlier than our grid

peak, so we still have peak, and I think the grid is pretty much at the max as it is.

I mean, we're contemplating electrifying cars. The thing is, when we talk about Zero Net Energy, a lot of people want to get off of fossil fuels, so it's driving people to want to go to more electric houses, so we're going to throw more demand on the grid, which is already at the limit. Scotty can't give us any more. So unless we reduce load on the grid otherwise.

We need to shift peak. You know, if PV is one of the predominant, that means we need to shift peak to earlier in the day, although I think in one of the reports they talked about peak getting later, but we're going to have to match our use to the resources we have. Currently PV is the only resource we really have to get to Zero Net Energy, so we would ultimately need ways to incorporate wind, various other technologies to get to Zero Net Energy.

Currently we define it only at the building or at the site, at least behind the meter. If we're going to require people to have a ZNE home, Martha talked about exemptions in the code, but the exemptions in the code are if you

can't do this, generally, you have to do that, so it's not like we say, well, if you can't do it you just do whatever the heck you want.

So if we're going to make people meet code ZNE and some people can't get there, we have to have an equitable path that says you don't get a free ride, and that's where offsite, you know, some mechanism needs to be had so that if they can't do it onsite, they somehow do it offsite so that they're not getting a free ride.

I think the other thing we have to remember is currently, I mean, solar is sold typically on cost. Essentially, buy a PV system, pay less than you would pay the man. And generally I think people are going to want it to be cost-effective. There are those of us that would do it even though it's not cost-effective.

So under the current net metering, and actually it's more the rate schedules than net metering per se, there is no -- I coined a new acronym at the last PG&E ZNE forum -- ZFI, Zero Financial Interest. So currently under net metering, or even if you have a meter, and the rate schedules, you have no economic interest in going beyond a zero bill, and a zero bill is less

than zero net electric consumption. And of course, you know, you hit that point, you get minimum charges and that takes away some of that, but to the customer, you know. I mean, if it's code, whether it's cost-effective or not, they're going to have to do it.

So just the point is that we're probably going to have to change the rate schedules and come up with the value of your generation separate from your consumption, and that value is probably less than what you -- well, whether it's less or more than what you pay, it really needs from a customer standpoint, the value of it needs to be more than the cost of putting in the system.

I can put 10KW on my house, but there's no economic incentive because it'll cost me more to install it than I could ever sell it for currently.

COMMISSIONER MCALLISTER: Okay. Thanks. Yeah, Rob, come on up.

MR. HAMMON: Thank you, Commissioner. Good morning. Rob Hammon, Bureau of Energy. One gratuitous comment, if I may.

I just want to wish a happy birthday to

Nelson Mandella.

Regarding the major content here, I'll send in notes to make sure you have all my information.

COMMISSIONER MCALLISTER: Yeah, please do.

MR. HAMMON: TDV really ultimately if we control peak, TDV becomes source, and I think it makes more sense to be source energy than TDV, but those two are both reasonably attainable goals and I want to make sure that we stay with those two and not try to adopt site. It's not been discussed but I just want to make sure we don't go there because it's not attainable in the near term.

I think we need to address peak directly as opposed to through TDV. As Mike Keesee pointed out, if you do look at the climate zone 12 peak, it's in September. That's pretty bizarre. And if you do some winter analyses, you get some very funny things happening between electric appliances and gas appliances that just don't make sense.

And my last comment for now would be that I think we need to encourage and incent

SMART. I'll call them microgrids. That may be raising some flags that would worry some people, but community skill efforts that would promote energy efficiency peak and storage, because we're going to need to do storage to make the grids secure. Thank you.

COMMISSIONER MCALLISTER: Thanks very much, Rob. Very good stuff. Your last point in particular I think is going to inspire a lot of discussion.

So John, you have some slides here?

MR. MCHUGH: Yeah, but I think I'd probably only be able to show one or two.

COMMISSIONER MCALLISTER: if you could just rip through them, and obviously they should go into the record and we have a few people still in the room, or at least one still in the room, and then we have some folks, we have six people on the phone, so the phone folks are going to have to be pretty quick, I think.

MR. MCHUGH: So I'll put these into the record. Why don't we move to the next slide, right to the proposal. Here are some suggestions not only for the definition of ZNE but also for the Energy Efficiency Strategic Plan goal, and

the first one is to define -- actually, it's not clear what residential is in the goal, and Title 24 historically has had a portion of the standards that were residential focus which are low rise residential and that high rise residential is grouped with non-residential, and so for the 2020 goal I think the goal should be modified so that we're looking at low rise, and this allows us to prepare for success rather than preparing for failure for the 40-story high rise or something like that.

The other thing is that, in terms of definitions, everyone gets focused on the 20 percent rather than the 80 percent, so define what ZNE is and not worry about in terms of your definition how you address all the others, because that's the equivalency issue.

So all houses are ZNE or equiv, and then you have the equivalency for the exceptions. And the obvious one is I'm not going to cut down the 300-year-old Redwood so I can have PV.

I'm on the ASHRAE 189 Committee, the design of high performance green buildings, and how we address the issue of equivalency is that you're not allowed to use equivalency rules

unless you don't have solar access, so the house that's behind the 300-year old Redwood or the house that's in the urban canyon tucked between various buildings, well, you don't get to use equivalency unless you're in those kinds of situations. And still the 8020 rule, you know, all these houses that are being built south of I-50. There's no issue in terms of solar access for those houses.

And then of course to move the high rise into the 2030 goal along with the rest of the non-residential.

So now to get to the actual definition of ZNE itself is one which has a California Building Energy Code compliance software design rating of zero or less, and that ruleset includes the plug loads that are also included in the HERS rating.

So what we have is something that is clear, it's well defined. And to speak to Bob Ramer's issue about liability, the builder is not making the promise that it zero builds or anything else but saying "I met this particular code requirement," and that's what I need to do.

Now in terms of, I actually think all

these other definitions of ZNE actually confuse. If I have Coke, I don't want something that's called Coca and Coke Light and they're all different companies. So for ZNE I think that what you have is you have a definition of ZNE, and then what is equivalent is just what's code compliant in 2019, so near ZNE, ZNE Light, ZNE Electric, all these other things, I think, confuse the market and the state really should just be focused on what is the definition of ZNE and then, of course, for the 2019 standards to figure out what those equivalency rules are.

So I'll stop here because I know you've got limited time.

COMMISSIONER MCALLISTER: Great. Thanks, John, I appreciate it, but definitely submit those to the record.

So one more quick comment in the room and then I think we need to go to the phones.

MR. MOHAMMED: Thank you, Commissioner. My name is Abdul Mohammed. I am the Emerging Technologies Program Manager for Southern California Gas Company, and we have been involved in the long-term strategic plan development when we went through all the exercises of workshops

and things like that. I just have two quick questions.

One is I would like to know what is the schedule for the adoption of the definition, if it will be a full Commission adoption hearing and adoption and what is the timeline, I'd like to know that.

And number two is that I'm looking at the presentation that Martha and Cathy made and I'm looking at slide 6 of the definition that's been proposed. Assuming that Zero Net Energy strategy is to address the electric grid, and assuming that TDV or source energy, whichever definition is adopted, is field neutral, then I would question or I would like -- I'm a little bit alarmed with the second sentence which says -- or the second line which says "onsite renewable," so that really excludes all cost-effective alternate fuels, other fuels other than renewable.

So that's the concern, because one could develop a fuel that has very low TDV values and could meet the zero net definition but could be disallowed because the definition is only for renewables.

COMMISSIONER MCALLISTER: Or only for onsite? Is your problem the renewable definition or the onsite?

MR. MOHAMMED: Yeah, onsite, yeah.

COMMISSIONER MCALLISTER: Okay.

MR. MOHAMMED: And especially when you look at technologies such as fuel cells or microgrid technology, which could meet all the carb and the emissions requirements with potential, since we cannot project the future and forecast the future, there could be, say, carbon sequestration technologies that could allow, natural gas technologies or even any other fuel to be used onsite to produce the electricity to meet the zero energy definition.

MS. BROOK: So I don't think that we're trying to preclude any of that. For one, our TDV does cover alternative fuels. We have TDV for gas and propane, not just electricity.

MR. MOHAMMED: Right, but the definition says renewable, that's what my question is.

MS. BROOK: And if there are other renewable technologies that use other fuels or aren't PV, those would certainly be considered.

MR. MOHAMMED: They don't have to be

renewable, that's what I'm trying to say.

COMMISSIONER MCALLISTER: Well, then how are you going to offset energy, I guess (inaudible)?

MS. BROOK: Our definition -- I don't know, we weren't intending to have to define renewable here, that's not even in our purview, at least not mine, but the idea is that it's a clean energy source.

MR. MOHAMMED: Sure.

MS. BROOK: If there's other clean energy sources just like you've described, they would certainly be able to be used for that purpose.

MR. MOHAMMED: Right, it could be clean but not renewable, but the definition says onsite renewable, that's why.

COMMISSIONER MCALLISTER: They still have to figure out some way to comply with some Zero Net Energy definition.

MR. MOHAMMED: Of course. Of course.

MS. BROOK: Okay. Now I understand your question. Okay.

MR. MOHAMMED: Thank you.

COMMISSIONER MCALLISTER: No, thanks for

your comment. And if you could submit that in the written record, that would be great.

MR. MOHAMMED: Yeah, we will be. We will be working.

COMMISSIONER MCALLISTER: Okay.

MR. MOHAMMED: And about the schedule, are we going to ask Martha, is there a schedule as far as adoption?

MS. BROOK: I'm sorry, the schedule, basically our intent is that the full Commission will adopt the IEPR and this definition will be in the IEPR report.

MR. MOHAMMED: When is that?

MS. KORESEC: The IEPR is scheduled to be adopted November 13th at this point.

MR. MOHAMMED: November. Okay. Thank you.

MS. KORESEC: All right, we're going to move to our folks on the web. Can you open Bill Dakins' line.

Okay, Bill, your line is open. Did you have a question? Bill? All right, I think we may have lost Bill.

Next we have Christopher Goff. Mr. Goff, your line is open if you'd like to make a

comment.

MR. GOFF: I'm sorry, I had you on an external speaker and I'm putting on a headset.

MS. KORESEC: Thank you.

MR. GOFF: No, actually no comment at this time, thank you.

MS. KORESEC: Oh, all right. You had your hand raised earlier, that's why we thought you had a comment.

MR. GOFF: Oh, no, that was, yeah, earlier.

MS. KORESEC: Okay. Next is Matt Grocoff (phonetic). Matt, we're opening your line now. All right, Matt seems to have logged off.

Next is Brandon De Young. Brandon, we're opening your line now.

MR. DE YOUNG: Oh, can you hear me?

MS. KORESEC: Yes, we can. Go ahead, Brandon.

MR. DE YOUNG: Okay. Brandon De Young with De Young Properties, the new home builder in Fresno. Just a couple real quick things.

You know, we talk a lot about PV and how it all fits into the picture, but I feel like a

lot of time we never talk about the new lease products that are available these days and that kind of a big game changer as far as the cost goes and how it fits into, you know, when it actually becomes feasible in a project. So I just wanted to kind of throw that out there. At least solar is kind of becoming a big deal with now.

COMMISSIONER MCALLISTER: Brandon, what new product are you talking about?

MR. DE YOUNG: Well, we're doing an emerging technologies program right now with PG&E actually and on this particular project we're using a solar city prepaid lease, so it's like a dollar a lot, basically, and it's a 20-year lease, prepaid up front, no annual or monthly payments after that, you just pay a low amount right up front and that's the whole thing for 20 years.

COMMISSIONER MCALLISTER: Okay. So a lease product, okay, that's what you said.

MS. KORESEC: Prepaid lease.

COMMISSIONER MCALLISTER: Yeah, prepaid lease product. We couldn't make you out very well.

MR. DE YOUNG: Yeah. Oh, okay.

And then my only other comment had to do with energy use estimating as far as plug loads and all that and how they fit in. We've been trying to do our best to verify the energy modeling software estimate that our California companies are doing for us through they're using Energy Pro, and for each of our floor plans we get these estimates annual basis and we are able to, sort of in partnership with PG&E, start to verify, without addresses so that we're not dealing with privacy issues, but verify how far our actual customer bills are from our estimations from Energy Pro, and on average they actually come in very, very close.

So I think in partnership with the utilities, builders like us can, and if it's streamlined a little bit better, can start to verify our models compared to actual floor plan usage.

COMMISSIONER MCALLISTER: Thanks for that. And I think it goes back to you're sort of speaking to the urgency of this issue of making sure that the assumptions we make really meets climate zone for the non-core energy use plug

load specifically are as up-to-date as they could be so that we're in the ballpark with the TDV calculations, etcetera. So thanks for your comments.

MS. KORESEC: Thanks, Brandon.

MR. DE YOUNG: Absolutely.

MS. KORESEC: Next we have Ann Edminster (phonetic). Ann Edminster, sorry. Ann, your line is open. Ann, are you there? All right, Ann may have dropped off.

All right. Last we have Andrew Rileman (phonetic).

COMMISSIONER MCALLISTER: We're a little bit over time so maybe people have --

MS. KORESEC: People may have already dropped off, yeah.

COMMISSIONER MCALLISTER: They're out at lunch now, yeah.

MS. KORESEC: Yeah, so it looks like we no longer have Andrew either.

All right, so that does it for the folks on our WebEx. We can take a moment to open our phone lines. I think we still have 12 people on the phones, but we have to open them individually, unfortunately, the way our system

is, so that's going to take a minute or two.

COMMISSIONER MCALLISTER: They can't raise their hand in any way?

MS. KORESEC: No, because they're on the phone, they're not on the WebEx.

MS. KORESEC: Okay. Go ahead and open all the call-in users, Linda. So I'm getting phones lines now. If you have any comments, please chime in.

All right, it doesn't appear that we have any folks on the phone that are talking. And if we missed anybody on the phone or on the WebEx, please make sure to submit written comments because we do want to make sure that we get your comments on the record, and we're sorry if we missed you.

So with that, we're ready to wind up.

COMMISSIONER MCALLISTER: Yeah, I think we're ready to adjourn here. I'll just thank everybody for coming. I think this certainly I would want to thank
Cathy and Martha for the presentation and all the hard work that's gone to getting us to this point and as well as the three percenters early in the earlier panel.

And Ed, if you're still on, thanks very much for being with us and we'll look forward to continuing dialog to include you in this discussion.

So as Martha said right at the end, the goal here is to have an adoptable definition in the IEPR document so that we can really just as a core foundational resource for moving forward with the next round of Title 24, Cal Green and Title 24, Part 6. So the goal is to be adopted with that document hopefully by the end of the year. Sometimes it runs over a little bit, but the goal right now is November, so it's really important that we get your comments and thoughts on how to make this as workable as possible without making it more complex. I think that's really the trade-off that we have to work with.

So with that in mind, go forth and think about it and get back to us.

It's a really exciting time. I agree that California is leading this effort and people look to us and I think we want to give them another example to emulate what we're doing, and we do that by ending up with a product that the marketplace actually uses in practice and we

really need to keep that in mind, so I appreciate everybody's participation in getting us there.

Thanks very much and we're adjourned.

(ADJOURNED)

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